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JOURNAL of Wildlife Rehabilitation

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Returning Broken Bats to the Wild . . . . . p. 7

Letters to the Editor

Dear Editor:

I read Selena Walker's article on anorexia in bats, in the *Journal of Wildlife Rehabilitation*, Volume 19 No. 3. Because of Selena's quest to put puzzle pieces together, I thought that I might lend some suggestions on care of *Eptesicus fuscus*.

I would first question the use of this antibiotic for a scuffed nose. Bats are extremely healthy creatures and a typical cat-caught bat would have had more injuries than a scuffed nose. I have had many bats who have had old injuries to their bodies and wing membranes and healed quite nicely on their own. Antibiotics should be used very sparingly and on known cat cases. Antibiotics, especially Chloramphenicol, tend to interfere with the bat's natural curative powers by lowering their immune systems, leaving them vulnerable to many other maladies.

I would also strongly stress that bats not be subjected to flea or mite powders because they have had extremely bad effects on bats. Any parasites can be removed by hand and when the bats are placed in a container with a white cloth, the parasites usually climb off. By removing the "bedding" daily, you will successfully remove all of the parasites in 3-4 days.

I have been caring for bats in California for nine years. We have a different climate with at least 13 different species. Bats which normally migrated and are brought in during the winter are overwintered by being kept cool (40°F) room and allowed to sleep for a week at a time. They are then brought into a warm room (76-70°F) and allowed to warm for an hour. They then eat their fill of fortified mealworms and drink large quantities of fortified water (30ml distilled water, 2 drops of Avitron®, 1 drop Avimin®). The bats are kept in their containers in a warm room for two hours and then allowed to go back to sleep in their cooler room.

Bats are unique mammals and certainly deserve the newly-found interest that they have sparked within the rehabilitation community. I, for one, am very happy to see the swing from fearing bats and turning them away at wildlife centers to accepting and caring for them.

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Dear Christine,

Often as we try to complete the puzzles in wildlife rehabilitation we find sections (of the puzzle) which result in further questions. Such is the case with protocols for the care of wildlife. The difficulty one encounters when publishing care protocols is to present the "typical" case scenario without downplaying the fact that a wide range of factors are considered in the decision-making process for each individual animal. Decisions are based on a combination of knowledge gained from the resources and experiences of others and that gained from our own. Consensus cannot be attained regarding the range of acceptable wildlife rehab practices because wildlife rehabilitation is not an exact science. A wide range of acceptable practices will inevitably result.

The three issues you raise: antibiotic use, use of insecticides to eliminate parasites, and hibernation are controversial. With regard to the use of antibiotics, which recently has become a significant subject of scientific inquiry especially as it pertains to the development of antibiotic-resistant bacteria, a variety of acceptable practices exist. The Wildlife Rehab mailing list on the Internet (http://www.cc.ndsu.nodak.edu/~devold/twrid/html/hp.htm) has presented a wide spectrum of views over the last year with regard to antibiotic treatment. In November 1996, the "consensus" posted on the list was that antibiotics, including Amoxicillin, Baytril, Septra/Bactrim, Chloropalm, were administered routinely to cat-caught or suspected cat-caught wildlife. Medications, in general, have associated side-effects and contraindications. Antibiotics typically exert their effects by killing bacterial microorganisms; certain antibiotics kill certain bacterium (Brown, 1995). Although ineffective against viruses, antibiotics are sometimes administered to those with viral infections to prevent secondary bacterial infections which could result from a weakened condition (Brown, 1995). As you pointed out Christine, negative side effects are possible, if not frequently occurring. If antibiotics are administered appropriately (correct dosage and regime), under veterinarian supervision, the chances of experiencing these side effects are reduced.

Chloramphenicol, specifically, is contraindicated for human infants since it can result in gray syndrome. Gray syndrome is a toxic reaction due to the inability of immature renal and hepatic systems to effectively eliminate Chloramphenicol (Canadian Pharmaceutical Association, 1996). In humans, Chloramphenicol treatment may also result in certain types of anemia, headaches, stomach upsets and a variety of

Continued on page 16

JOURNAL of Wildlife Rehabilitation

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Features

Wildlife Rehabilitation: Expanding the Wildlife Management Framework
Shirley J. Casey
Alan M. Casey III
WildAgain Wildlife Rehabilitation, Inc.
Evergreen, CO 3

Returning Broken Bats to the Wild
Christine Scott, *California Bat Conservation Fund*
Scott Sims, DVM, *Pegasus Veterinary Clinic*
Ross, CA/Novato, CA 7

Departments

Letters to the Editor . . . . . Inside Front Cover
Guest Editorial 2
"State Fish and Wildlife Agencies and Wildlife Rehabilitation: Changes in Attitudes, Changes in Latitudes"
IWRC Newsletter . . . . . Center Insert
IWRC Conference Call for Papers . . . . . Center Insert
IWRC 1997 Literature Catalog . . . . . Center Insert
Dispositional Statistics Survey. 14
Book Review 17
"Messages from an Owl"
Conference News . . . . . Outside Back Cover

Cover Photo: Provided by Christine Scott

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Guest Editorial . . .

State Fish and Wildlife Agencies and Wildlife Rehabilitation: Changes in Attitudes, Changes in Latitudes

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After reviewing and making editorial comments on the article by Shirley and Alan Casey in this issue on the relationship between wildlife rehabilitation groups and State fish and wildlife agencies for the *Journal of Wildlife Rehabilitation*, it occurred to me that it might be worthwhile to explore that relationship a bit further and discuss changes in attitudes in a guest editorial. But first, let me give you a bit of background. I have been a wildlife veterinarian in the employ of the California Department of Fish and Game (CDFG) for over 19 years. I was the first wildlife veterinarian hired by CDFG, a distinction that has allowed me to observe changes in various kinds of attitudes first hand.

Early in my career I was involved in raptor rehabilitation and fracture repair and visited and interacted with many wildlife rehabilitators such as Gary Bogue, Dave Garcelon, Pegin Barrett and Martine Collette. But most of my efforts have been directed toward improving capture techniques for free-ranging wildlife, epidemiology and pathology of diseases, and most recently marine animal ecotoxicology. I have followed the maturation of wildlife rehabilitation in California with interest. Unfortunately, I have occasionally been drawn into intense interactions and confrontations with members of the wildlife rehabilitation community. Most recently I have had the opportunity to run one of the first State wildlife agency programs that actually utilizes private wildlife rehabilitation groups, that integrates wildlife care into wildlife resource management, and that provides training, equipment and supplies and, in some cases, financial support for building or improving wildlife care centers. Talk about changes in latitudes !!

The experience that most clearly demonstrated to me the change in attitude between CDFG and the wildlife rehabilitation community occurred in 1991, very shortly after I transferred to CDFG's Office of Oil Spill Prevention and Response (OSPR). My new supervisor, who had spent his 30 year career in pollution response, and had no previous interaction with the wildlife rehabilitation community, wanted me to go with him to The Marine Mammal Center so he could meet their director. Just before we were to leave he asked "I understand that we don't have a very good relationship with these people, do you have any idea why?"

After a few moments thought I said, "Well, for the 15 years I've been with the Department we have told them, and the rest of the wildlife rehabilitators, that we don't believe that what they do is of value. That we will tolerate them, but we don't support them, and won't assist them in any way. Occasionally we have had confrontations with individuals who were acting, or perceived to be acting, at cross purposes to Department policy. And you know, after 15 years, they think that's the Department's attitude."

Continued on Page 12

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Wildlife Rehabilitation: Expanding the Wildlife Management Framework

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Abstract

In the United States, wildlife rehabilitation is an activity that is governed primarily by regulations issued by state wildlife agencies. In this article, the authors present a conceptual framework which could be used to help agencies understand that wildlife rehabilitation, while possibly considered "outside the box" of traditional wildlife management, is within the changing scope of wildlife agency responsibilities. Two charts are included that were used by the authors to effectively discuss wildlife rehabilitation with the Colorado Wildlife Commission during a recent review and revision of the wildlife rehabilitation regulations in that state.

KEY WORDS: wildlife rehabilitation, wildlife management, wildlife agencies

Beyond 'Hook and Bullet Clubs'— Changing Expectations

In the last few decades, the scope of responsibilities and activities of state wildlife agencies have expanded far beyond the traditional role of merely ensuring that adequate wildlife populations exist for the enjoyment of anglers and hunters. State wildlife agencies now find themselves facing a wide range of responsibilities involving wildlife, which more and more involve recognizing the needs and desires of new constituencies outside what have, at times, been informally described as the "Hook and Bullet Clubs".

The sense of urgency demonstrated towards any of these specific issues and responsibilities will vary, depending on state statutes, resource levels, legislative sentiment and a variety of other factors. These other factors can range from longer term changes in national and regional demographic trends (numbers of hunters is on the decline in the U.S. (Decker,1993); or public opinion towards traditional methods of taking wildlife such as the use of leg-hold traps (Manfedo, et al,1995)), to more immediate local situations and events (disease outbreaks in certain wildlife populations in the state; or the results of the ballot box, in the form of referendums and grass roots initiatives).

Examples of these new responsibilities can range from formally providing input to county commissioners about placing shopping centers in a sensitive wildlife habitat; to overseesing aquaculture; to monitoring sensitive non-game wildlife species (including frogs and beetles); to development of strategies to protect ecosystems and biodiversity. While the scope and depth of state wildlife agencies responsibilities vary significantly, there is little doubt that the public expects the agencies to do far more than ensuring ample fish and game for license buyers.

Wildlife Rehabilitation as a Regulated Activity

Since wildlife is generally considered the property of the state (unless it happens to be privately owned, as in a game park or zoo), wildlife rehabilitation is an activity that properly falls within the responsibilities of a state wildlife agency. Our research in 1994 on state wildlife rehabilitation regulations across the United States showed that most state wildlife agencies do have some regulations governing wildlife rehabilitation activities (Casey, 1994).

But the research also highlighted the fact that those regulations were often relatively brief, vague or outdated when compared to regulations on other, more traditional hunting, fishing and wildlife management related activities. There are probably a variety of reasons that this is the case.

One reason may be that wildlife rehabilitation, in the eyes of a state wildlife agency, is still a relatively new activity, and has only recently received the visibility and recognition it truly deserves. Secondly, wildlife rehabilitation does not involve a broad scale activity, when compared to other wildlife agency activites and priorities. Perhaps another may be that there are those in an agency that believe that those good hearted people willing to help an injured animal and return it to the wild should be allowed to do so with minimal government interference. Or maybe it is that an agency with limited financial resources believes it does not have time or staff to give attention to an activity that involves so few people or animals.

While there are many more plausable and valid reasons, our experience suggests there may exist an even more fundamental reason why a state agency could be slow to appreciate or embrace wildlife rehabilitation activities.

Recognizing a Fundamental 'Disconnect'

Wildlife rehabilitation is very different from many of the other activities which fall under the umbrella of traditional wildlife management (Dunlap, 1988). Many of the traditional and emerging agency activities are wildlife *species* oriented, such as monitoring wildlife population trends, minimizing the negative impact of commercial development on sensitive wildlife habitat, or working to reduce noxious weed infestations. Rehabilitation, on the other hand, is focused on saving *individual* animals. (Though rehabilitators are often in a position to identify emerging issues, such as being among the first to notice an outbreak of a disease that could threaten sensitive populations.)

As a general rule, many of the traditional activities regulated by the state wildlife agencies can be broadly categorized as pertaining to wildlife used for either "Consumptive" or "Non-Consumptive" purposes. Regulations can be further categorized as to more specific recreational, commercial, scientific research or educational purposes or uses (Wagner, 1995). *Yet wildlife rehabilitation does not fit neatly into these traditional categories.*

Rehabilitation clearly is not a hobby or recreation (many of the tasks are not fun: removing parasites from a wound, euthanizing animals, cleaning cages, etc.). Rehabilitation costs money rather than makes it. Rehabilitation involves technical problem-solving and scientific procedures but is not scientific research. Rehabilitators are often involved in educating the public about wildlife, but wildlife rehabilitation is not solely an educational effort.

It became obvious that to get the Colorado Wildlife Commission to understand and approve new wildlife rehabilitation regulations, we needed a way to demonstrate that wildlife rehabilitation is a legitimate wildlife related activity, but admittedly one that falls "outside the box" of traditional wildlife man-

EXAMPLES OF WILDLIFE RELATED ACTIVITIES involving Wildlife Agencies and the Public

	Recreation	Commercial	Scientific & Education
"Consumptive"	Hunting Fishing Trapping Falconry Dog Training & Field Trials	Trapping Aerial Shooting Commercial Fishing Commercial Lakes Private Lakes Commercial Wildlife Parks Raptor Propagation Elk Ranching	Scientific Collection Educ. Collection (study skins, mounts)
"Non-consumptive"	Wildlife Watching Nature Photography Falconry	Exhibition for Education Private Parks (game birds, etc.) Aquaculture: hatchery	Educate the public on wildlife, habitat, etc. Teacher education Wildlife programs for schools Project Wild

FIGURE 1

agement. Additionally, research has indicated that some of the public even expect a wildlife agency to be more directly involved with the saving of individual animals, beyond just indirectly involved through the licensing of wildlife rehabilitators (Siemer, 1994).

Establishing a Common Frame of Reference

We developed the chart shown in Figure 1 to help generate discussion with Colorado Division of Wildlife (CDOW) Staff and the Colorado Wildlife Commission during the revision of our state wildlife rehabilitation regulations (1994-95). Discussion of this chart followed a more thorough discussion of the definition of wildlife rehabilitation; basic components (facilities, zoonoses, euthanasia, release, etc.); costs; myths about rehabilitators; agency benefits of working with rehabilitators; and how rehabilitation fit into their newly developed Long Range Plan (containing new areas such as increased public stewardship of wildlife, involving more women in wildlife activities, etc.). (More specifics on this process are described in the "Wildlife Rehabilitators and a State Wildlife Agency: Strengthening a Relationship" Journal of Wildlife Rehabilitation, Summer, 1995.)

Wildlife rehabilitation did not fit very well into the traditional categories that the CDOW staff and Wildlife Commission were accustomed to using. The "Consumptive "and "Non-consumptive" groupings that were frequently used as broad categories just did not work in this case. The discussion even prompted the Staff and the Commission to acknowledge certain 'gray' areas, including that some "non-consumptive" activities could in fact do harm (e.g., disturbing birds during breeding) and "consumptive" did not always result in wildlife being consumed (in the case where wildlife was not taken during a hunting or fishing trip). Later in the discussion, rehabilitation was generally considered to be non-consumptive; and although some euthanized animals were used as food for other rehabilitating animals, it was a very different type of "consumption".

There was healthy discussion by some of the Commissioners that while rehabilitation was not commercial, scientific research or educational, they initially felt it must have an aspect of recreation to keep people motivated. To this view, rehabilitators presented an analogy by comparing rehabilitation to volunteer fire fighters, who volunteer to do often unpleasant, high risk tasks to save lives. Both activities take dedication, special knowledge and skills, a willingness to take risk, and commitment to life. As such, volunteer fire fighting is not considered recreation, nor, felt the rehabilitators, is wildlife rehabilitation.

EXAMPLES OF WILDLIFE RELATED ACTIVITIES
involving Wildlife Agencies and the Public That "Expand the Box"

	Recreation	Commercial	Scientific & Education	*Expanding the Box*
"Consumptive"	Hunting Fishing Trapping Falconry Dog Training & Field Trials	Trapping Aerial Shooting Commercial Fishing Commercial Lakes Private Lakes Commercial Wildlife Parks Raptor Propagation Elk Ranching	Scientific Collection Educ. Collection (study skins, mounts)	
"Non-consumptive"	Wildlife Watching Nature Photography Falconry	Exhibition for Education Private Parks (game birds, etc.) Aquaculture: hatchery	Educate the public on wildlife, habitat, etc. Teacher education Wildlife programs for schools Project Wild	**Wildlife Rehabilitation** Advise on Human/ Wildlife Problems Importation of Exotic / Non-native species

FIGURE 2

Finally, it was agreed that wildlife rehabilitation seemed to be somewhat "outside the box" of traditional wildlife management functions (Figure 2) — and that it was likely that other wildlife related activities would also be "expanding the box" in the future. These charts and discussions, following the basic information about rehabilitation, seemed to help provide a better understanding and perspective of where wildlife rehabilitation fits.

Demonstration of a Better Understanding

The discussions and work by the rehabilitators, CDOW Staff, and Colorado Wildlife Commission helped raise the overall understanding of wildlife rehabilitation and its benefits to wildlife and people. The Colorado Wildlife Commission approved most of the wildlife rehabilitation regulations recommended jointly by the CDOW staff and rehabilitator stakeholder group. It included a very specific statement to "...recognize wildlife rehabilitation as a legitimate wildlife related activity and permit qualified individuals to provide for the humane care of distressed wildlife..." for eventual return to the wild (CDOW regulations, 1995).

In addition, *Colorado Outdoors*, a CDOW publication, recently highlighed wildlife rehabilitation in their May-June 1996 issue. This collection of three articles very effectively describes wildlife rehabilitation and the many benefits rehabilitators provide to wildlife and people, profiled some rehabilitators and the species they rehabilitate, and described how a person decides whether wildlife needs to be rescued. It showed that the CDOW clearly views wildlife rehabilitation to be within their scope and puts "...more emphasis on public responsiveness and recognizes changing public values" (Kelly, 1996).

Conclusion

As wildlife rehabilitation grows, state wildlife agencies and wildlife commissions will be required to become more familiar with the many aspects of wildlife rehabilitation, including public expectations around the services provided by wildlife rehabilitators and how it fits into overall wildlife management. Each state wildlife agency will have different functions included in their scope of responsibilities. We suggest that a conceptual framework can be helpful in better explaining that wildlife rehabilitation, while perhaps a non-traditional activity for them to consider, is indeed a legitimate wildlife related activity.

From time to time, wildlife rehabilitators may find themselves helping their wildlife agencies deal with and understand an issue outside their traditional comfort zone. We offer these two charts as one way to expand discussion and create a picture that shows while rehabilitation did not fit neatly into the *traditional* box, it does fit within the *changing* scope of wildlife management.

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Continued on Page 13

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Returning Broken Bats to the Wild

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Abstract

This case study details successful veterinary and rehabilitative care for bats presented with compound fractures of the radius. One case history is detailed and the disposition of seven such surgeries are reported. For many years this injury was considered fatal because they had bones that were perceived to be too small to repair and because fear regarding the rabies status bats hampered obtaining appropriate veterinary care. Consequently, many bats were euthanized. However, due to the pioneering efforts detailed in this article, some of these creatures are now being repaired and returned back to the wild.

Key words: Pallid Bat, *Antrozous pallidus pacificus*, *Myotis yumanensis*, *Tadarida brasiliensis*, *Eptesicus fuscus*, intramedullary pinning, radius fracture, rehabilitation care.

Introduction

In California, there are some 23 species of bats, 16 of which have some special status—either Species of Special Concern with California Department of Fish and Game, or they are Category 2, which signals that populations should be looked at to determine if they are indeed declining (Federal Register, 1996).

Every year, the California Bat Conservation Fund receives hundreds of calls from people who have bats or would like to attract bats to their property. Because of all the myths and superstitions, other people become fearful when they discover a colony on their property. By taking the time to speak with these people, detailing what the bats are doing and more importantly what they are not doing, many hundreds, if not thousands, of bats have been saved from destruction by overly aggressive and apprehensive homeowners.

Approximately 40-50 bats per year are brought in for care. Many have been accidentally stranded in residential structures, quite a few are orphaned babies, and several are presented with bone fractures. The following paper explains, in detail, how some of the more serious cases were rehabilitated and released.

Case Study

The first subject was a Pallid Bat—*Antrozous pallidus pacificus*—who was transferred to the California Bat Conservation Fund (CBCF) with a compound fracture of the radius approximately mid-shaft. The finder, a nurse, had splinted the bat's arm to prevent any further soft-tissue damage.

A representative from the CBCF approached our local veterinarian (and co-author) who was willing to attempt intramedullary pinning in a fractured bone in a bat's arm (wing). This is an uncommon procedure in a species that can be very, very small. Although there is mention by Routh, in his 1991 article *Bats in the Surgery: a Practitioners Guide*, of the procedure of pinning especially in larger bats—it does not document that these procedures resulted in releasable animals. It also does not clearly state whether the larger bats were megachiropterans weighing up to 2 lbs. or whether they were very large microchiropteran bats which can weigh nearly 9 ounces—most U.S. species weigh less than 1 ounce.

With any open fracture, antibiotics should be started as soon as possible. In this case, medication did not start until the second day so we

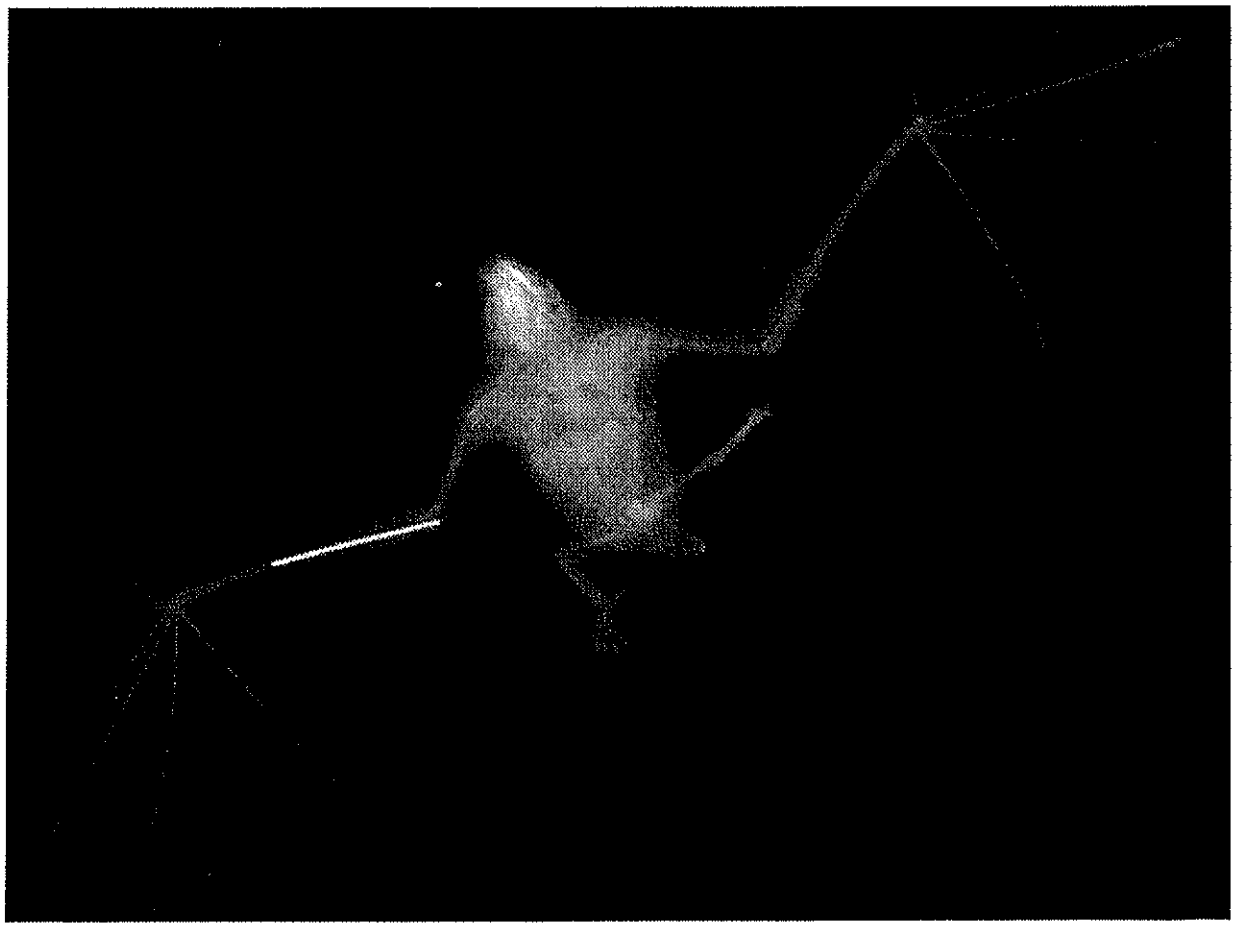
chose an injectable which would rapidly achieve a therapeutic level. The 19-gram bat was started on Naxcel® (Ceftiofur Sodium) (dosage on the label lists 0.08-0.2/chick, for poultry dosage) at the smallest dose of .01 cc intramuscularly, BID for 10 days. Clavamox Drops® (Amoxicillin and Clavulanate Potasssium) oral preparation has also been used successfully (6.25 mg/lb.) with the dose for smaller bats at .01 to .02 cc BID for 7 days. The drops are perhaps preferred if the skin has not been open to infection prior to the pinning (i.e., closed fracture). As with many animal species, and the small *Myotis spp.* in particular, it appears that it might be better to start medication, hydrate and stabilize the bat for a day prior to the procedure.

The procedure itself is begun by anesthetizing the bat with anesthesia levels of between 1% and 2% IsoFlor® isoflurane in oxygen, flowing slowly (.25 liter/min in a non-rebreathing circuit) through a small plastic breathing mask, which in the case of bats becomes a whole body bag. Once the bat is inside of the bag and access to room air is cut off, it is only a matter of seconds before the bat is anesthetized. The amount of isoflurane is controlled by adjusting the vaporizer or by removing the bat from the bag. The bat is placed draped in a sterile manner and positioned on top of a heating pad set on low.

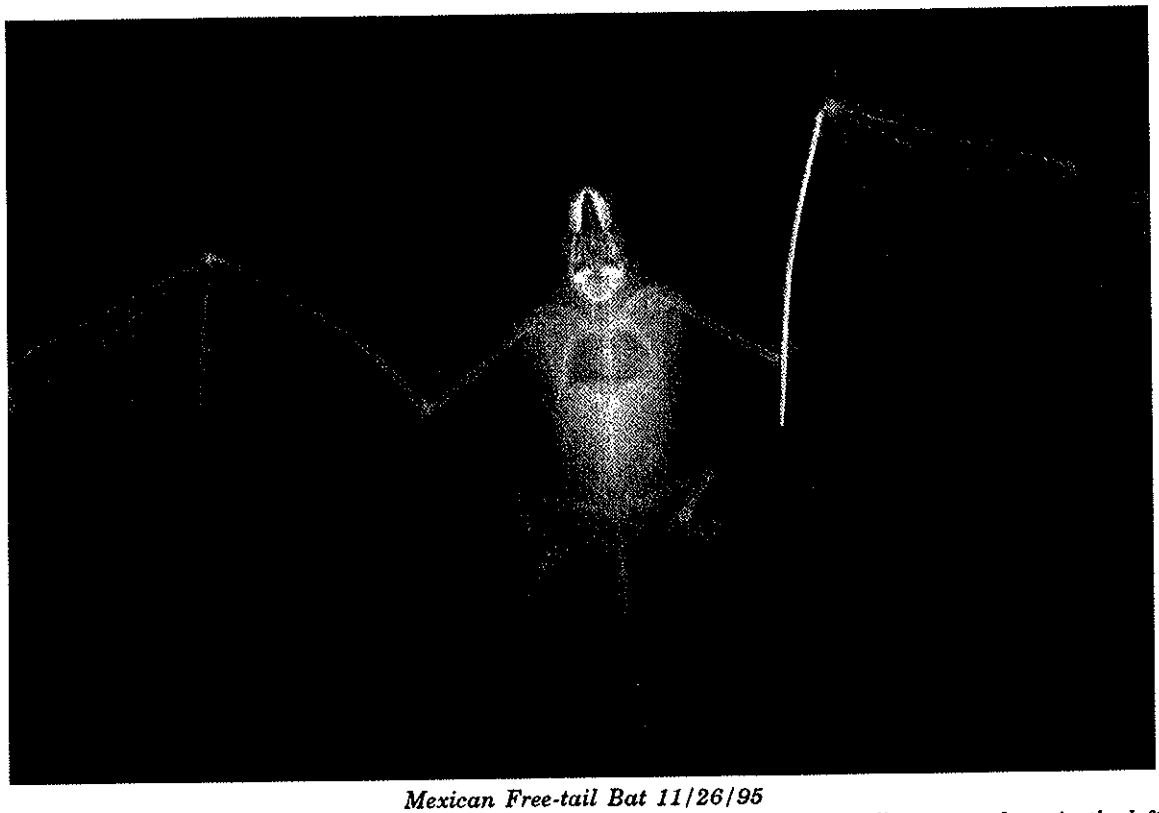
Radiographs, taken before the operation, give the surgeon the necessary information to assess the damage to the bone and formulate a treatment plan. In the case of a closed fracture, an incision, approximately 5 mm, is made directly over the break to expose the trauma site. A 20-gauge hypodermic needle (Monoject®) was used for the Pallid Bat as the intramedullary pin with a length long enough that when placed inside the proximal bone portion it extended beyond the break by a minimum of 3 to 4 mm for stability but not into the epiphysis (growth plate). On smaller bats, the core of a 22-gauge spinal needle has been used successfully.

The hypodermic needle is threaded through the fracture site of the proximal radius and extended out through the elbow joint, then the blunt end was cut near the hub of the needle. The distal portion of the radial bone (the separated end) was bent at a 90° angle and maneuvered so that the fractured end projects through the same initial incision, without causing undue trauma to the tendons or soft tissue. The blunt end of the needle is placed inside the marrow cavity thereby connecting both bones.

As is the case standardly, the needle or



Pallid Bat 8/13/95
Compound fracture mid-shaft of the radius with pin in place. A 20-guage hypodermic needle was used.



Mexican Free-tail Bat 11/26/95
Compound fracture of the radius near the epiphysis. The core of a 22-guage spinal needle was used to pin the left radius.

pin should be close to the exact width of the bone and move smoothly inside the cavity. When the fracture is reduced and the pin placed properly, the arm should move as a whole unit. The sharp end of the needle extending beyond the elbow can be bent over on itself to prevent punctures to the wing membrane. When the bat is turned over ventrally, both arms should be in alignment with the thumbs equally opposing each other. The rough ends of the bone segments should prevent the bone from rotating out of position. If not, a regular check on the alignment of the thumbs should be made and the pin can be carefully rotated back into position.

Unreconstituted Kefzol® (Cefazolin Sodium), an antibiotic powder, was sprinkled along the incision and then the incision was sutured using 5-0 or 6-0 nylon suture material for two small sutures. While the bat is still anesthetized, it is given Lactated Ringers® subcutaneously along the back between the shoulder blades with an injection of .05cc per gram of animal weight. The anesthesia is turned off and the bat allowed to wake while still on the heating pad.

The bat is placed in a small 10" x 7" bat box[1] with soft cotton mealworm bags draped over the sides. The bat is then allowed to rest and hang normally—relieving any stress to the fracture site. A very small container or jar lid of water fortified with Avimin® (mineral supplements with calcium) and Avitron® (vitamins)[2] and a small bowl of mealworms for self-feeding bats[3] is placed on the floor of the container. For the non-self-feeding bats, the bat must be fed mealworms with forceps daily to maintain the proper weight for the species. A temperature gradient is provided by placing a heating pad set on low over the top and side of one end, so that the bat is able to regulate its own heat. The antibiotics are continued for 10 days post surgery. The bat is allowed to rest and recuperate in the small box in a quiet room for approximately five weeks. This is slightly less than usual for mammals and slightly longer than for a similarly sized bird. However, mammal bones usually take longer to heal than birds who have hollow bones.

[1] Use Rubbermaid-like plastic laundry baskets which come in a variety of sizes. Panels of fiberglass window screening are hot-glued over the holes on all sides. A lid is made from fiberglass screening with elastic sewn around the edges to make a snug fitting lid.

[2] Add 2 drops of Avitron® (vitamins) to 50 cc's water along with 2 drops of Avimin® to provide extra minerals. Both of these items are manufactured by Lambert Kay and can be found in any pet store.

[3] Mealworms should be fed a good diet of wheat germ, wheat bran, bone meal, carrots and broccoli and can be purchased via mail by Rainbow Mealworms, Inc. (800) 777-9676.



Pallid Bat 9/4/94
Healed fracture site with the pin removed.

The pin can be removed after five weeks for Pallid Bats with larger bones and perhaps, four weeks for the smaller-boned *Myotis spp.* A radiograph can confirm the extent of healing. The pin is removed after the bat is again anesthetized with isoflourane. Needle nose pliers are used to pull the pin carefully straight out. There is no need to suture the small exit hole—it heals in a matter of days completely untreated.

The bat is then moved to a larger container (22" X 16" or 1 1/4 bushel basket) constructed in the same fashion as the smaller one so the bat is free to move and stretch. The bat is taken out once a day for wing extensions which helps loosen up a slightly stiffened wing. Within 4-5 days it is ready to join the ranks of the flighted. The bat is held 4 to 5 feet above the floor in a carpeted room and gently "tossed" to a blanket spread on a couch or hung from the curtain rod, so that if the bat is not ready to fly it will not reinjure the arm (wing). After a few days and a few tries the bat should become airborne. After a couple of weeks of flying laps around an uncluttered room (12' x 17') and acquiring the ability of staying in the air for 20-30 minutes—it is time to release the bat back into the colony.

Release should only be done in the spring, summer or early fall. In the author's opinion, winter-injured bats (that normally hibernate) should be kept through the winter until the bat's colony has reformed in the spring in areas where the winter temperatures are consistently below perhaps 55-60° F. This Pallid Bat was released on 10/7/94 at the site where it was originally found 4 months earlier. Throughout most of the United States, bats hibernate through the winter and if released then would likely die due to lack of available insects to forage.

It has been assumed that bats cannot be kept over the winter months and then released (Routh, 1991). However, many of the bats cared for by California Bat Conservation Fund have been over wintered and then subsequently released in the spring. One bat was kept for four years, and when released, was documented to survive by radio-telemetry (Scott, 1996).

Concerns About Rabies

Bats, unfortunately, have been singled out as "carriers" of rabies, although the statistics hardly bear this to be any more true of bats than other vector species. The estimate of rabies occurring in wild populations appears to be approximately 1 in 1,000. Bats found grounded and brought in for care can have incidence of rabies approaching 1 in 10 (Constantine, 1994).

However, the number of positive bats varies widely from area to area in the United States. Wildlife rehabilitators should consult with their county or state human health departments to become aware of the prevalence of this disease in bats in their area.

Obviously, anyone who works with bats or any mammals in areas where rabies has been reported should consider having pre-exposure rabies vaccinations. Depending on your health status, these vaccinations may or may not be recommended by your physican or the county health department medical doctor. It is desirable

to have one or two people at each rehabilitation center who have current rabies prophylaxis in order to handle the variety of "reservoir species" most commonly received by your organization.

Unfortunately, many humane societies in California and some other parts of the United States refuse to take bats in for care, instead euthanizing them. This course of action leaves the finder of an injured bat with few options. A rehabilitation center that refuses to accept bats from the "Good Samaritan" who finds them, may put the general public at more risk due to the fact that many people would then attempt to care for an injured bat at home—increasing the exposure factor by untrained people with good intentions. Many of these injured bats, who are suffering from no other disease, can be repaired and returned to the wild.

Conclusion

To date, seven bats have been pinned (6 radius, 1 humeral) with this method; three *Atrozous pallidus*, one *Myotis yumanensis*, one *Tadarida brasiliensis* whose fracture was extremely close to the joint and one *Eptesicus fuscus*. They all healed beautifully but only the three Pallid Bats are flying at this time. This appears to be a relatively simple procedure and one that could be duplicated around the country. As our bats decline further, it will become increasingly important to try to return some of these animals to the wild. As with any wildlife rehabilitation effort, there are always animals that will not be releasable. These bats provide the basis for educational programs at zoos or museums or when placed with educators in states which will permit it, providing the appropriate permits have been obtained in advance.

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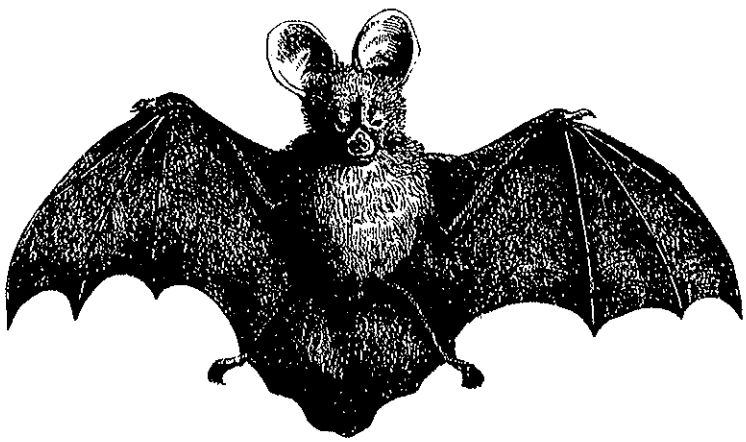
Author Profiles

Christine Scott

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

Scott Sims, DVM

Dr. Simms earned his B.S. degree in Zoology in 1979 and DVM in 1984 from UC Davis, Davis, CA. He operates a mixed practice with an emphasis on equine and aivan patients. Scott served his internship at South Valley Large Animal Clinic (SVLAC) in South Jordan, Utah and then returned to UC Davis to work on a research project for four months in 1985. He worked at SVLAC for four years following his internship on a referral equine surgical practice. Dr. Simms attends a minimum of four veterinary symposia annually. He has worked with wildlife undergoing rehabilitation since 1982.



Continued from Page 3

He responded, "Wow, I guess we have some making up to do." I strongly affirmed that.

In 19 years I have seen an expansion in the responsibilities of State wildlife agencies, with a move away from the traditional "hook and bullet" concerns; to concerns for non-game species; threatened and endangered species; native fish, insects and plants; and now all native ecosystems. I've seen a sea of change in the type of people employed in State fish and wildlife agencies. Most younger employees are better educated, more open minded, and there is much more ethnic and gender diversity. The attitudes of these newer employees toward many things, including wildlife rehabilitation, are more flexible and supportive.

Wildlife rehabilitation itself has matured and professionalized. Publications like the *Journal of Wildlife Rehabilitation, NWRA Quarterly* and the leadership of organizations like IWRC and NWRA has not gone unnoticed. Teaching of wildlife medicine and rehabilitation at many veterinary schools and the development of larger professional wildlife centers speaks well of your vocation to both the public and to the wildlife agencies. In general, as wildlife rehabilitation organization have grown they usually become realistic, more practical in their approach, and more comfortable with their State fish and wildlife agency.

As you know, although State fish and wildlife agencies are the trustees for wildlife resources, few wildlife agencies actually provide care for ill, injured or orphaned wildlife, or wildlife compromised by oil spills or other anthropogenic activities. The states' agencies rely on you, the private wildlife care providers, organizations, and networks to provide these services. Some states do keep wildlife seized as evidence, others house these animals with wildlife rehabilitators or in zoos. Some States provide care for endangered species, usually as part of a reintroduction program, and some keep small herds or colonies of research animals. In recent years the need for good quality animal care within State agencies has increased and some employ veterinary technicians (see *Wildlife Journal* Vol. 11 No. 2). Again, these trends are likely to strengthen the relationship between wildlife rehabilitation organizations and traditional management agencies.

But, many biologists still firmly believe that only wildlife populations matter, that care for individual animals is a waste of time, and some still see it as potentially detrimental. Witness the concerted effort by some members of the marine bird biology community to argue that caring for oiled wildlife is a waste of time and money and should cease (ignoring that it is mandated by State and Federal law, removes sources of further contamination from the environment, and is paid for by the responsible party, and seldom, if ever, paid for by the taxpayer). That brings me full circle to my current job.

In 1990 the legislature of California enacted SB 2040 (Lempert, Keene, Seastrand) which established the Office of Oil Spill Prevention and Response within the California Department of Fish and Game, and placed a $.04 per barrel tax on oil transported or processed in California, the proceeds of which are to be used, among many other things, for care of wildlife affected by oil spills. It requires that CDFG provide "best achievable treatment" for oiled wildlife (not care just for those species we esteem, not whatever form of treatment we can throw together during an emergency). SB 2040 requires the establishment of rescue and rehabilitation stations for seabirds, Sea Otters, and other marine mammals, the first of which was to be built in the range of the Southern Sea Otter.

OSPR is building one facility at the University of California, Santa Cruz which, when completed in the summer of 1997 at a cost of approximately $5 million dollars, will be capable of caring for 125 Sea Otters, but flexible enough to care for other species of marine animals and house ongoing joint and cooperative research projects. By locating this facility adjacent to California's premier marine ecotoxicology laboratory (The Joseph L. Long Marine Laboratory), and by leaseback agreement committing to support appropriate research, OSPR has assured that its Oiled Wildlife Veterinary Care and Research Center will play a prominent role in marine mammal and sea otter research and management when not being used for oil spill response.

In 1994 a second piece of legislation SB 775 (Watson) allowed OSPR approximately $7 million dollars over a 4 year period to help establish an Oiled Wildlife Care Network (OWCN) to serve all marine species for the entire California coast in conjunction with existing scientific, educational and wildlife rehabilitation facilities. The first thing CDFG-OSPR did was enter into agreements with existing wildlife rehabilitation organizations that had a history of, and a commitment to, caring for oiled wildlife. We have attempted to provide needed equipment and supplies and training. In several cases improvements have been made to the facilities themselves.

Under this program new centers are being developed in San Diego, Orange County, Los Angeles, Santa Barbara, the San Francisco Bay Area and Humboldt County. Each of these centers is being developed in conjunction with an existing marine park, wildlife rehabilitation program, educational institution, or combination of com-

patible programs. International Bird Rescue Research Center will be housed at the Los Angeles and San Francisco facilities. Most of these programs have separate and additional sources of financial, political and personnel (volunteer) support, and this approach again assures that all OWCN centers will provide useful and appreciated services to the people of California when not in use for oil spill response.

A third piece of legislation in 1995, AB 1549 (Sher), expanded the OWCN mandate to include operations and maintenance of the OWCN, support of appropriate technology development and research, and allows OSPR to accomplish this through the Wildlife Health Center at University of California, Davis. A competitive grants program to broaden our understanding of the effects of oil on wildlife and to improve their care has been established and is open to proposals from any agency, company, university or wildlife rehabilitation group. The first request for proposals has been published and $100,000 was available in 1996. This will increase to $200,000 in 1997 and to $325,000 in 1998.

The OWCN is the first government, private non-profit, industry, professional educational/ research institution partnership of its kind in the United States. The OWCN allows the petroleum industry to meet legal requirements in all locations where they do business in California in a cost-effective and highly professional manner. This program also represents a State government commitment to integrate wildlife care with resource management, and ongoing research. Wildlife rehabilitation organizations have a big stake in its future.

In closing, I'd like to encourage you to recognize that State fish and wildlife agencies do have the legal mandate to manage native wildlife, including the animals in your care, and that their personnel, programs and attitudes are changing for the better. If other states follow California's lead we may see more appreciation for, investment in, and integration of wildlife rehabilitation into wildlife management. Let's try to keep a positive attitude, don't fall prey to the paranoia that "they are out to get me," and work with your State fish and wildlife agency. From your point of view that may be difficult at times, but in most confrontations, both sides lose. In general, I believe traditional fish and wildlife agencies and wildlife rehabilitation organizations are converging and will increasingly find it possible to be mutually supportive.

Continued from Page 6

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IWRC Internet WEB Page Update

The IWRC web page continues to grow. The page, located at: http://iwrc-online.org, has general membership information, program information (e.g., skills seminars schedules, conference information), and a general store section. Next year the web master, Joe McLeod, and his helpers, hope to add a section on IWRC history. Members are invited to look us up and comment on our progress.

Author Profiles

Shirley and Allan Casey are the founders of WildAgain Wildlife Rehabilitation, Inc., a non-profit (501(c)3) organization in the foothills west of Denver, in Evergreen, Colorado. They have been rehabilitators since 1986, first in Texas, and in Colorado for the last six years. Permitted for small mammals, they specialize in squirrels. In addition to participating with other rehabilitators in the revision of Colorado's wildlife rehabilitation regulations, the Caseys are very active in other wildlife policy issues. As well as writing articles on these subjects, they have presented workshops and programs on working with state wildlife agencies to a variety of groups, including the IWRC National Conference (1995).

When not rehabilitating wildlife, Allan is a financial manager for a major international coal mining and marketing company. Shirley is president of Strategic Linkages, Inc., which provides consulting services. Allan is also chair of the Wildlife Issues Steering Committee for the Colorado Environmental Coalition. The Caseys both hold the degrees of Master of Business Administration from Southern Methodist University.

Statistical Survey

The purpose of this survey is to determine what methods of calculating year end statistics are currently being used by Wildlife Rehabilitators. The International Wildlife Rehabilitation Council (IWRC) and the National Wildlife Rehabilitator's Association (NWRA) have compiled a list of standard definitions for use by licensed individuals and facilities. Use of these standards would allow overall compilation of average rates of success and allow each of us to compare our success rates with the overall average and determine in what areas we are excelling or potentially lacking. Results of the survey will be reported during 1997. This is not a contest. There are no winners or losers. No names will be used in the published information so we will only be able to judge ourselves.

NAME: _____

ORGANIZATION: _____

ADDRESS: _____

_____

_____

PHONE: _____

E-MAIL: _____

Are you completing the form as:

An individual ? _____
An organization ? _____

If you work under an umbrella license, please make sure that by completing this form you are not duplicating information already reported by the licensed individual/organization you work under.

How many animals were admitted during 1996? _____

What types of animals do you handle?

_____

_____

Following are the definitions used by the IWRC & NWRA. When using these standards, animals in all categories should be included in your statistics.

DOA (dead on arrival) - an animal that dies before any life-saving measures or treatments have been implemented in the care facility or by a home rehabber.

DIC (died in care) - any animal that dies subsequent to any handling, exam, treatment, or life-saving measures implemented in the care facility.

EOA (euthanized on arrival) - any animal euthanized after initial exam upon arrival.

E (euthanized) - any suffering or unreleasable animal that is humanely put to death.

R (released) - any animal that is returned to its natural wild habitat.

T (transferred) - any animal transported to another wildlife rehabilitator or facility for further rehabilitation.

PA (placement animal) - any animal determined to be unreleasable while undergoing wildlife rehabilitation efforts that is placed in a non-rehabilitation situation (i.e. education, propagation, research, zoo etc.)

P (pending) - animals currently undergoing rehabilitation efforts at the time of documentation.

If you are using the IWRC/NWRA definitions, please complete the following chart using your 1996 statistics:

	DOA	DIC	EOA	E	R	T	PA	P	TOTALS
Birds									
Mammals*									
Non-Natives									

*Please include reptiles and amphibians under mammals.

If you are not using the above categories, please show your statistics below or on an attached sheet. Please include definitions for your categories.

									TOTALS
Birds									
Mammals*									
Non-Natives									

Please send completed surveys to: Cathy Gidner-Worthington
WILDSIDE
8601 Houston Rd.
Eaton Rapids, MI 48827

Questions: (517) 663-6153
cgidner@aol.com

Return by March 12, 1996

Continued from the inside front cover

other adverse effects (Canadian Pharmaceutical Association, 1996). In a medline search of the literature from the last five years (1992-1996 inclusive) I did not find any documented evidence of these side effects in other animals, but, this may simply reflect the lack of scientific enquiry into this area. It is important, therefore, to weigh the pros and cons for each case individually in order to come to an appropriate decision. In my opinion, antibiotics are indicated for cat-caught bats. Unfortunately, it is not always easy to determine whether a bat has been attacked by a cat. Sometimes the wounds are not visible to our eye. Therefore, even if I only suspect that the bat has been caught by a cat, under veterinary supervision, I administer antibiotics.

Insecticide use, including environmentally-safe (pyrethrins) powder, to eliminate external parasites is also considered carefully, on a case-by-case basis. One must be cautious, since insecticides are toxic. Nevertheless, heavily infested animals may benefit from immediate removal of these parasites. The dosage I have used appears insufficient to cause toxicity, at least in adult bats (I have never used mite powder on babies or juveniles). As you have pointed out Christine, maintenance of good hygiene is essential, and is used as my sole method of parasite elimination for almost all intakes.

Artificial hibernation of bats has recently become a topic of discussion among rehabbers. In the International Wildlife Rehabilitation Council Proceedings of the 1995 Conference, Robyn Graboski (1996) published an article on rehabilitative care of bats which included a description of how to artificially hibernate bats in the fridge. At about the same time, Wildlife Rehabilitation Today published an article by Pat Barbosa (Fall, 1996) which warned against hibernating bats in refrigerators due to the lack of humidity. When I began rehabbing five years ago, the conventional wisdom was to artificially hibernate healthy bats in the fridge overwinter, something I, personally, never felt comfortable with. Recently, Patricia Winters posted to the Wildlife Rehab List her method of overwintering bats. She provides a gradient of temperatures by placing the cage in a cool room and providing a heat source at one end of the cage. She reported that some bats chose the warmer side and remained awake all winter (without ill effects) while others chose to hibernate. Christine, this method sounds similar to the one you are proposing. I like the idea, and may try this method of overwintering bats.

On a final note, one of the benefits of publishing hypotheses, methods and data is that it invites comments, criticisms, and further avenues of questioning. By necessity, these (comments etc) prompt additional research and an examination of our wildlife rehab decisions. This then allows us either to consolidate our practices based on the current information available or to alter practices based on outdated literature or beliefs. I have appreciated the opportunity to fully examine my methods and reasoning; thanks Christine.

Sincerely,

Selena Walker, M.A.
Volunteer Wildlife Network
16 Basswood Ave.
Stittsville, Ontario
Canada, K2S-1M9
swalker@rohcg.on.ca

Wildlife Symposium Information

The World Association of Wildlife Veterinarians (WAWV) will be sponsoring a Symposium on "Veterinarians in Conservation Biology" at the 7th International Theriological Congress (7ITC) at Acapulco, Mexico, from 6-12 September 1997. Dr. A. W. English, Treasurer, WAWV, is acting as convener for this important gathering of wildlife people, together with a Mexican colleague who is acting as co-convener. The Symposium will be a major component of the 7ITC Programme aiming especially on highlighting the various roles of veterinarians in conservation biology. Potential Contributors for this symposium should contact Dr. A.W. English, University of Sidney, Department of Animal Health, Private Mailbag 3, Camden, NSW 2579, Australia. Fax: 046-552931.

New FDA Regulations

We have a new regulation regarding the use of veterinary drugs in the United States. It is called the Animal Medicinal Use Clarification Act (AMDUCA) and went into effect on December 9, 1996. The newsletter of the *American Association of Wildlife Veterinarians* quotes Dr. Mark Drew's assessment of the impacts of this new regulation. "Of importance to wildlife veterinarians and wildlife managers is the FDA ruling that free-ranging wildlife that are or can be harvested for human food are considered food animals. Because of this classification, extra label drug use in free-ranging wildlife that have a harvest season must conform to AMDUCA regulations for use of extra-label drug use in food animals. In non-harvested or non-consumptive species, the provisions of AMDUCA that pertain to non-food animals would be appropriate." This regulation will change how we administer antibiotics in wildlife care.

Book Review

Messages from an Owl

Max R. Terman
Princeton University Press
Princeton, New Jersey
1996 217 pp. $24.95 Hardcover
ISBN 0-691-01105-2

This is a book that chronicles the rearing post-release activities of a Great-Horned Owl named, of all things, "Stripey." The author, a zoologist and teacher in a small Kansas town, is not a wildlife rehabilitator. He found the "orphan" owl who was about 4 weeks old and apparently food deprived. He had been told that the owl would be imprinted to humans and probably would not survive if released. Since about 60% of all wild-reared owls don't make it through their first year and about 30% die in the second, the odds for long-term survival for an imprinted owlet were certainly not good. The author decided it would make a good study (whether the owl was imprinted or not) and he really put his heart and soul into this project.

The owlet was deliberately tamed with the idea that a continued post-release relationship would be beneficial to both parties. The owl would have a "safety net" for survival and science would learn more about how this species, and more specifically, a hand-reared owl, learns to survive and propagate.

Following some basic training in hunting techniques, he released the bird late in the summer using a hacking method. Unlike the usual hacking procedure, he allowed the bird to return for food indefinitely. He goes through an amazing number of radio-telemetry devices over the seven year study period and with the help of his students and family gains access to the bird's world in a way that most rehabilitators would envy. He ponders many issues we face in rehabilitation (e.g., nature vs. nurture; instincts vs. practice and learning) and the answers are not simple. The book is written so anyone can understand and learn from it but conveys issues and biological concepts well.

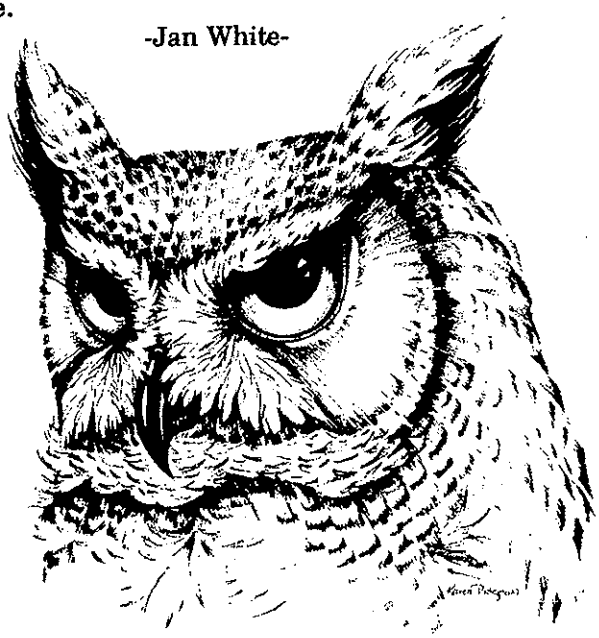
He has a number of "take-home" lessons for the wildlife rehabilitator. First and foremost, he says, "If I learned anything from Stripey, it was that if animals are to be released, they must first be trained to live in the wild—they cannot survive automatically." Well-said Max! And he has numerous examples to back up this statement. If you have ever thought about post-release study, I think that you will enjoy and learn from this book.

In one light moment, he ponders how the owl feels about the amazing ability of the scientists, family and students to find him. "The besieged owl no doubt was perplexed that so many people were able to follow his every movement. Owls, after all, are masterfully cryptical and accustomed to total anonymity most of the time."

Almost as an aside, the author profiles another owl and ponders the differences between the two case histories. One thing that I always look for in articles or books that chronicle wild animal rearing is growth charts. I was surprized to find growth charts, not on the captively reared birds, but on the offspring of a captively reared bird!

This is not a blueprint for wildlife rehabilitation. The family dog is prominently featured in one photo with the owl. The deliberate taming will ruffle some feathers. But when you look at what the goal of the study was, the taming has its place. This book does, however, hold lessons for those who want to learn about Great-horned Owls, biology, and how one owl learned to live independently and reproduce.

-Jan White-



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IWRC Conference Corner:

From Science to Reality—A Bridge to the 21st Century!
October 2-5 1997
Concord, California

Speaking of bridges, don't leave your partners at home. Let them tour San Francisco while you're at the IWRC Conference. There will be easy transportation to a magnificant ferry boat ride on the boat to The City for just $5.00. When you're through with science and stuff, they will be able to show you around town. Better yet, take them on the wine tasting/gourmet food tour we are offering as a pre-conference event.

Let your honey take the kids on a miniature train ride in Tilden Park. It's just 20 minutes away for only $1.00. What's more there is a merry-go-round for $1 two minutes away from the train. The Oakland Zoo can be reached by car in about 40 minutes and offers a whole day's entertainment for $4.00. For a laughing good time, we have arranged for a tour of the largest captive colony of Hyenas in the world. This is a rare opportunity to view these magnificent and unusual animals up close—all for a nominal fee.

There is a wide variety of shopping opportunities for early Christmas, travel gifts or just plain 'I gotta have it' across the street from the hotel. The more dedicated shopper can hit the big stores in Walnut Creek, just a mile away or in San Francisco, an easy trip by our rapid transit service, BART.

1997 is no time to leave your partner at home. Bring them with you and roll a vacation into these meetings!

Stay tuned to this part of your journal for updates on the conference and the developing program. We hope to see you in Concord for the 1997 IWRC Wildlife Rehabilitation Conference!