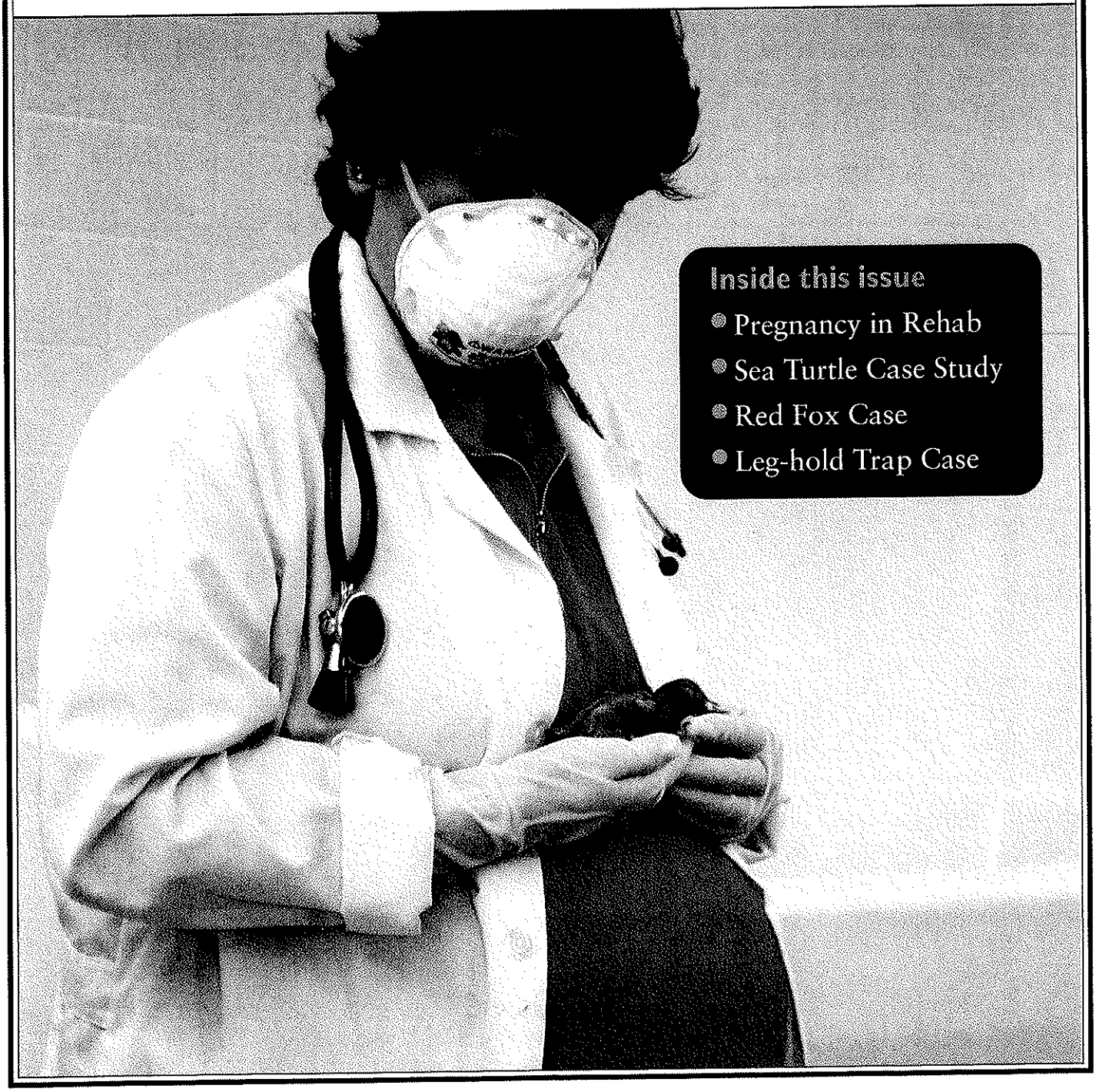
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SUMMER 1999
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JOURNAL OF WILDLIFE REHABILITATION



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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: A pregnant wildlife rehabilitator prepares to perform an intake exam. Note that she is properly gloved, masked and gowned. It is very important to follow proper health and safety precautions to aid in preventing diseases from being transmitted to the mother and/or the unborn child. Photo by Marge Gibson. See story on page 3.



INSIDE: A successful release. Saying goodbye to "Big Red," on the first day of the rest of her life! Photo by Pete Bloom. See story on page 27.

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EDITORIAL

United We Stand

Wildlife rehabilitators are all good people with good intentions. They are capable of heroic acts of kindness and generosity. They work long, hard hours and have little time for personal lives. However, they are also human and subject to all the same shortcomings, foibles, character flaws, and mistakes that everyone else is. Many are more comfortable around animals than people. In the scheme of things they are a small group of dedicated individuals working toward a common goal.

Wildlife rehabilitation is a rapidly growing field that has made great strides toward professionalism in the last five to ten years. It is also an important field and its members provide a wealth of services and valuable information about native wildlife to the general public. Working together as professionals, there is every reason to believe that someday wildlife rehabilitation will be more widely recognized and, yes, provide an income commensurate to other wildlife professions.

That is why I am so disappointed when I hear about individuals or organizations that attempt to undermine or discredit other rehabilitators or groups, often for no other reason than to express personal frustrations or further a personal agenda. It is even more disappointing when other rehabilitators accept such comments at face value.

There may often be legitimate reasons for such disagreements to occur. However, conscientious individuals or organizations do not air these concerns in public. Responsible individuals work out their differences or agree to disagree on points which remain unresolved. Organizations have policies in place which establish a protocol by which to consider grievances. They handle problems confidentially as a matter between the involved parties only. Issues are investigated, examined from every perspective, discussed and carefully considered. Complaints can and should be resolved in a professional manner using the most appropriate channels.

Rumor and innuendo are insidious foes. They undermine good working relationships and trust, and take an enormous amount of energy away from the prime goal—good rehabilitation practice. In the end, after spreading broadcast havoc, these tools of discord damage the individuals who have used them as much, or more, than the original targets of complaint.

On a lighter note, there is an unattributed phrase that expresses the complexities of hearsay:
"I know you believe you understand what you think I said, but I'm not sure you realize what you heard isn't what I meant."

We all hear the opinions of those around us, but we hear them within our own perspectives. If we perceive that the idea behind the words supports our own view of the world, we are inclined to integrate it into our own thoughts. If it challenges our already established beliefs, we may be shocked to attention or denial. If it actually defies our paradigms we tend to reject the idea totally or reshape it to fit what we "know" to be true. Let us all be aware of this characteristic human behavior and strive to control it with reason and responsible behavior.

If we support each other, discourage unsubstantiated rumors, and approach each situation with integrity, we can all stand tall—because united we stand, divided we fall.

Mary D. Reynolds
Acting Editor

Potential Occupational Hazards to Pregnant Wildlife Rehabilitators

By Catherine M. Brown

ABSTRACT: The major occupational hazards posed to pregnant women in wildlife rehabilitation can be divided into four categories: 1) zoonotic disease, 2) physical injury, 3) radiation exposure, and 4) chemical exposure. Since exposure to radiation and chemicals is prevalent in only a small group of wildlife rehabilitators, and physical injury is not specific to the profession, the possible reproductive effects of zoonotic diseases are emphasized

KEY WORDS: Wildlife rehabilitation; pregnancy; zoonosis; occupational hazards

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The practice of wildlife rehabilitation poses many health risks to the people involved, primarily in the form of physical injuries or zoonotic diseases. Given the large number of females actively involved in the field, it is not surprising that there is concern regarding the possible adverse reproductive effects associated with the profession. In addition, since most rehabilitators are not associated with formal institutions or facilities, there is minimal regulation and supervision of safety standards and guidelines. It is essential that members of the profession work to disseminate accurate information in order to protect themselves.

Unfortunately, the number of epidemiological studies done to identify actual risks in wildlife rehabilitation has been negligible. Even in the relatively closely related field of veterinary medicine, the amount of research is limited and the cause-and-effect relationships that have been identified are of weak statistical significance. Therefore, the information presented in this paper is largely theoretical and no data on actual incidences of negative reproductive outcomes are contained.

In addition, otherwise important zoonotic diseases such as rabies or hanta virus, which do not have known specific reproductive effects, are not included. While pregnancy very slightly decreases the T-helper cell count, a woman's immune system is not substantially suppressed and therefore she is not more susceptible to disease simply due to her pregnancy.

The major occupational hazards posed to pregnant women in wildlife rehabilitation can be divided into four categories: 1) zoonotic disease, 2) physical injury, 3) radiation exposure, and 4) chemical exposure. Since exposure to radiation and chemicals is prevalent in only a small group of wildlife rehabilitators, and physical injury is not specific to the profession, the possible reproductive effects of zoonotic diseases will be emphasized.

Zoonotic Disease

Fungal, bacterial, viral and parasitic organisms can cause zoonotic disease. The manner in which any of these organisms, but particularly parasites, can affect reproductive health is varied. First, the infecting organism can cause such severe debilitation that either conception, implantation, or a normal term pregnancy, cannot occur. Second, they can adversely affect the health of the mother such that medical termination of the pregnancy may be necessary. Third, they may infect the fetus itself and cause effects such as abortion, malformation or death. In addition, they can act in conjunction with other factors such as maternal malnutrition and immunodeficiency to make a normal, healthy pregnancy impossible. Fortunately, malnutrition and parasitism are not problems that are common in developed nations such as the United States, Canada, Australia and most of Europe. They do still play a significant role in the health of humans in developing countries.

Bacteria

Campylobacter fetus is a bacteria found worldwide in the intestinal tract of sheep and cattle, as well as other birds and mammals. The organism causes outbreaks of abortion in sheep and sporadic cases in cattle. It is not known to

cause disease in other animals. Campylobacteriosis in humans is usually associated with some predisposing factor such as pregnancy, premature birth, chronic alcoholism, cancer, and cardiovascular disease.

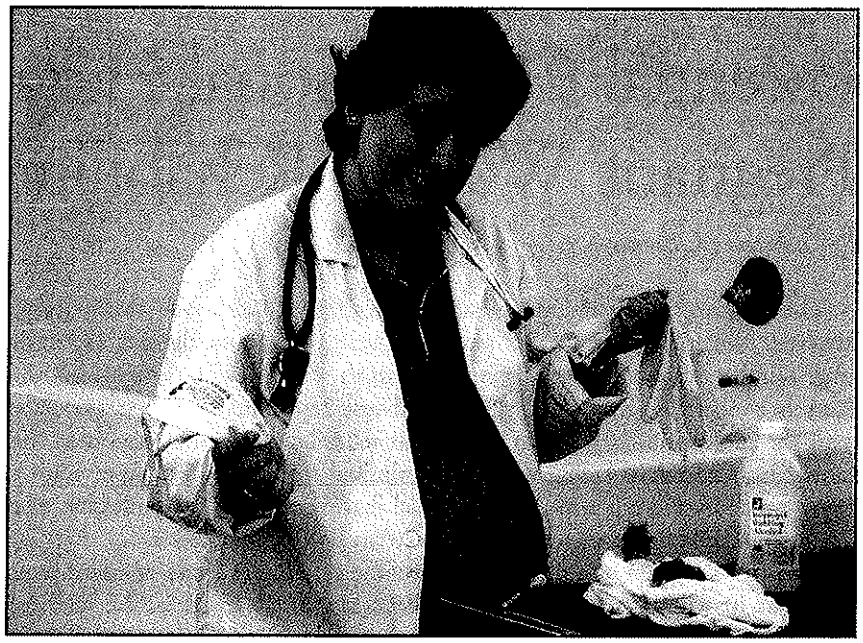
In pregnant women the disease is usually seen after the fifth month of pregnancy and starts with a fever and diarrhea. The disease can cause miscarriages as well as pre-term deliveries although some women will carry to full term. Premature infants, and less frequently full term ones, will frequently develop a fever, cough and diarrhea which progresses to meningitis within 2-7 days with a case fatality rate of 50%.

Treatment with antibiotics is possible and fairly effective in adults. The method of transmission between animals and humans is not known although direct contact with infected animals or ingestion of contaminated food or water is considered likely. Strict hygiene is probably the best defense against contracting the disease.

Campylobacter jejuni is a bacteria with a worldwide distribution that is considered to be one of the primary causes of diarrhea disease in humans, especially in developed countries. Many different species of wild mammals and birds carry this bacteria, often without symptoms. Humans become infected through accidental ingestion of the organism, usually through a contaminated food or water source, but poor hygiene practices could lead to infection as well.

The disease in humans is an acute diarrhea disease, accompanied by fever, abdominal pain, vomiting and blood or mucous in the stool. Recovery is usually spontaneous within 7-10 days. Complications are rare but can include abortions.

Leptospira interrogans is shed in the urine of many different species of wild and domestic animals, particularly rodents. Infection in humans usually occurs through contact with contaminated water, but both direct and aerosol transmission has been known to occur in people working directly with infected animals. Two forms of the disease exist, the anicteric form is a relatively mild, flu-like syndrome and recovery occurs spontaneously. The icteric form of the disease is quite serious and prolonged and can include liver and kidney insufficiency. This form of the disease could theoretically interfere with a healthy pregnancy.



Pregnant rehabilitator prepares to perform an examination. (Photo by Marge Gibson)

Listeria monocytogenes is widely distributed in both soil and vegetation, and in human and animal intestines. In general, listeriosis is a rare, sporadic disease that is contracted mostly by immunosuppressed individuals such as those undergoing chemotherapy, transplant patients and those with an HIV positive status. However, young children, geriatrics, pregnant women, and those suffering from concurrent disease are also more susceptible than the general population. Although outbreaks are likely to be associated with contaminated milk products or other foods, wildlife rehabilitators would appear to be at increased risk for this disease due to close contact with a variety of animals. Individual infection can occur via aerosol transmission, fecal self-contamination of the genital tract, or ingestion of the organism from hands contaminated with fecal matter.

Most pregnant women that become infected with *Listeria* remain asymptomatic. Symptoms, if they do occur, are non-specific and flu-like, and characterized by fever, chills, headache and general malaise. The disease is generally mild and not associated with serious problems. Neonates that are infected in utero, prior to the onset of labor (early-onset listeriosis), develop a generalized septicemia with multi-organ involvement that can result in stillbirth or pre-term labor. Late-onset listeriosis occurs in healthy infants carried to term that are infected either during delivery or soon thereafter. Meningitis is the most common manifestation of this form of the disease, which is often complicated by severe neurological sequelae such as hydrocephalus and mental retardation. Infant mortality rates are high with both forms of this disease.

Treatment with antibiotics is possible and, if started early enough, can result in a normal, healthy infant. Good hygiene practices should be sufficient to prevent fecal-oral transmission of the disease in most situations although the omnipresence of the organism in the environment

makes total avoidance impossible.

Lyme disease, caused by the spirochete *Borrelia burgdorferi,* is an entity that remains to be completely elucidated. The disease is transmitted by the tick *Ixodes dammini* (deer tick) in the eastern United States and by *Ixodes pacificus* (black-legged deer tick) in the western US. The white-footed mouse is the primary host of the larval and nymphal stages of the tick while the adults prefer white-tailed deer. Humans and animals contract the disease when an infected tick feeds off of them. The disease in humans generally starts with a rash initiating at the site of the tick bite and spreading outward. Flu-like symptoms may also occur at this time. Stage II is characterized by musculoskeletal pain, frequently in the joints, and then, usually, neurological involvement. Stage III involves episodes of arthritis, usually in the second and third year of the disease, which may lead to chronic arthritis.

There is some evidence that infection with the Lyme disease organism during pregnancy can have specific risks. Transplacental transmission has been shown in at least five cases, all associated with stillbirth or neonatal mortality (Sweet and Gibbs, 1995). The Centers for Disease Control (CDC) has noted that possible adverse outcomes include pre-term delivery, infant death, syndactyly (fusing of fingers or toes), and blindness. However, a separate study conducted by Strobino et al. did not establish any connection between prenatal exposure to Lyme disease and any type of fetal illness or death.

Despite lack of hard evidence that Lyme disease carries more serious implications for pregnant women than for non-pregnant ones, appropriate precautions should be taken. Avoiding infection is best achieved by avoiding the tick vectors of the disease. Suggestions include not handling deer, using tick repellants, wearing long pants and long-sleeved shirts, and daily personal tick surveillance and removal.

Salmonella species do not pose a particularly special threat to pregnant women. Salmonellosis is dangerous only in that generalized severe disease can lead to spontaneous abortion or other complications of pregnancy. While reptiles are the most frequently implicated, as carriers of *Salmonella,* the organism has been isolated from a wide variety of mammalian, avian and reptilian hosts. Transmission is via the fecal-oral route and routine hygiene should be sufficient to eliminate the chance of infection.

Shigella dysenteriae is primarily of concern in tropical, developing nations but can occur worldwide. Although the bacteria has been isolated from other species, such as bats, captive non-human primates are the primary carrier. It is not known if monkeys harbor the organism in their wild environment. Infection occurs, usually transmitted from human to human, but animal to human transmission is possible, through poor hygiene and results in severe diarrhea, fever and abdominal pain that can last for several weeks. As with *Salmonella,* there is no specific threat posed by *Shigella,* but the severity of the disease could interfere with a normal pregnancy.

Viruses

The Western and Venezuelan Equine Encephalitis viruses are members of the arbovirus group and are transmitted by mosquitoes. WEE is carried by domestic fowl, wild birds and horses and has been found in both North and South America. The disease is usually asymptomatic but can cause a flu-like syndrome or meningoencephalitis. Infants born to infected mothers appear fine initially but develop evidence of meningitis in less than a week. The disease can be severe but permanent neurological damage appears to be rare.

VEE is carried by horses and small rodents and has been found in Central and South America as well as Texas and Florida. The disease in adults is similar to that of WEE but the affects on the fetus are more severe. The virus targets developing brain tissue. Infection during the first trimester of pregnancy has been known to cause stillbirth, microcephaly (small brain), microphthalmia (small eyes), and hypoplasia (underdevelopment) of the brain. Infection later during gestation results in massive destruction of both cerebellar and cerebral brain tissue.

Eastern and St. Louis Equine Encephalitis, carried primarily in birds, are similar types of viral organisms, that also cause encephalitis in humans. EEE is more rare than the other forms but is also the most highly fatal. Neither EEE nor St. Louis EE are associated with any specific risks to pregnant women.

There is no vaccine or treatment available for any of these diseases. Wildlife rehabilitators may be at a slightly increased risk for contracting one of the equine encephalitis viruses because of their proximity to birds. Close proximity results in an increased chance that a mosquito will bite an infected bird and then bite a human. Unfortunately, there is no way to identify infected birds easily since the virus is benign in avians. Local mosquito control programs and individual protection such as long-sleeved shirts, pants and regular applications of mosquito repellant are the only means of prevention.

Lymphocytic Choriomeningitis (LCM) is a viral disease caused by an RNA virus carried in the house mouse (*Mus musculus*) and the field mouse (*Apodemus sylvaticus*). The disease has been found in all continents except Africa and Australia. As with many zoonotic diseases, naturally infected wild animals generally do not show disease. Infection in humans can occur from rodent bites, ingestion of food contaminated with rodent urine or feces, and has been transmitted experimentally with the use of an arthropod (insect) vector.

The disease in humans is generally mild and consists of flu-like

symptoms. This may proceed to meningitis, or meningitis may appear without any previous symptoms. Long-term effects and death are rare. However, in utero infections can occur and may result in encephalitis, hydrocephaly (fluid accumulation in the brain) or chorioretinits (inflammation of the choroid and retina of the eye) in the fetus.

Parasites

Amebiasis is an ulcerative disease of the colon caused by the protozoa *Entamoeba histolytica.* Although the primary reservoir of this organism is man, non-human primates can contract it from man and then pass it back to them. Other animals, such as dogs, which can become infected with the disease are not able to subsequently re-infect humans. While this is a disease of concern primarily to developing nations where up to 40% of the population may be infected, there is an infection rate in the US of 3-4% of the general population (Sweet and Gibbs, 1995).

Infection occurs through ingestion of food or water contaminated with feces or from contaminated hands. The infected individual can remain asymptomatic for years or may have fulminant dysentery. However, asymptomatic or mild forms of the disease may suddenly develop into severe cases during pregnancy or soon after childbirth. There is no evidence that intrauterine transmission occurs but the infant can easily become infected by its mother after birth.

Giardia is another protozoan parasite that can cause diarrhea disease in humans. While the primary reservoir of the disease in humans is other humans, animals represent an additional source of possible infection. Transmission occurs through accidental ingestion of contaminated food or water or from contaminated hands. While there is no specific effect of the disease upon the fetus, there is some evidence that the disease is more severe during pregnancy than at other times.

Leishmania donovani is yet another protozoan parasite that can cause problems during pregnancy. The visceral form of the disease (as opposed to the cutaneous form) occurs throughout Asia, Africa and Central and South America. Domestic dogs and wild canids are the reservoir of the disease that is transmitted between animals and people by biting flies. Infection can occur 10 days to several years before the onset of symptoms which are nonspecific and can include liver enlargement, coughing, diarrhea,anemia, lymphadenopathy (swollen lymph nodes), fever and emaciation. Transplacental transmission can occur and can result in increased fetal death.

Toxoplasmosis, caused by the intracellular parasite *Toxoplasma gondii*, is one of the most widely known zoonotic diseases with the potential to adversely affect reproduction. Human infection occurs from eating raw or undercooked meat of infected animals or through contact with oocysts from the feces of an infected cat. Domestic cats and certain members of the *Felis* and *Lynx* genera are capable of transmitting the disease. Healthy women exposed to the organism prior to pregnancy develop antibodies to the disease and pose no threat to the child. Primary exposure to the organism during pregnancy can cause a multitude of problems.

The rate of fetal infection (in other words the chance that the mother will infect the fetus) is higher if maternal infection occurs in the third trimester than if it occurs in the first. However, the severity of the fetal infection is greater if it becomes infected in the first trimester rather than in the third, even though there is less chance of transmission in the first three months. The disease in the healthy adult is subclinical and may at most produce a fever, sore throat and lymphadenopathy, typical flu-like symptoms. HIV infected individuals are likely to develop severe, multisystemic disease. The disease in the pregnant female can cause such problems as abortion, pre-term delivery, chorioretinitis, intracranial calcifications (calcium deposits in the brain), microcephaly and hydrocephaly.

Treatment is possible both for the mother, prior to deliver, and for the infant after delivery, but it is prolonged and expensive. For wildlife rehabilitators considering becoming pregnant, a pre-pregnancy titer should be considered. If exposure has already occurred, there is no need for concern. If the titer is negative, you should discuss with your doctor your risk and come up with an appropriate prevention and screening plan.

Physical Injury

Evidence regarding a correlation between physical demands during pregnancy and adverse outcomes of pregnancy, such as pre-term delivery, has been weak and inconsistent. Mamelle et al. did find a relationship between an occupational fatigue index and premature birth, but a survey study by Wilkins et al. was unable to establish a similar link. While it seems logical to assume that some of the strenuous physical demands associated with wildlife rehabilitation might play a role in precipitating preterm delivery, studies focusing on postural fatigue and heavy lifting do not support this.

However, musculoskeletal injuries are one of the most common causes of time-off across all professions (Hill, et al, 1998). They can occur as a result of a single incident or can develop as a result of chronic, repetitive tasks (repetitive stress disorder). The redistribution of weight and altered center of gravity that occurs during pregnancy could increase the likelihood of falls, particularly on a slippery surface, and may also cause adoption of awkward postures that can exacerbate repetitive stress disorder. Decreasing the likelihood of injury can be achieved by pacing your-

self, varying your tasks, changing posture regularly, interrupting repetitive motions, wearing non-skid footwear and being aware of obstacles around you that might impede your progress.

Handling animals to examine, medicate, move or restrain are other situations in which the changes in weight distribution and body shape can cause adverse effects. Certain individuals may experience an increase in clumsiness and instability due to the rapidity of physical changes that occur.

Animal bites and scratches are perhaps the physical injury most likely to occur and potentially lead to adverse effects. Contamination of the wound leading to a generalized infection or septicemia of the mother can cause infection of the fetus or neonate either via transplacental transmission or during delivery. *Pasteurella multocida*, the bacteria most commonly associated with cat bites, is present in other species as well and has been implicated in a maternal/fetal infection (Escande, et al, 1997). Additionally, septicemia in the pregnant female can induce spontaneous abortions or preterm deliveries resulting in illness or death of the fetus.

Radiation Exposure

Exposure to x-ray radiation, particularly during the first trimester of pregnancy, is known to be a cause of developmental defects in the embryo. While most wildlife rehabilitators are not subject to frequent radiation exposure, particular caution should be used when attempting to become pregnant or suspicious of a possible pregnancy. Governmental guidelines set the annual occupational dose for an individual at 5 rems. The total dose to the embryo/fetus during the entire pregnancy should not exceed 1/10 of that (0.5 rems). If there is an x-ray machine in use at a facility where a female worker is attempting to become or suspicious that she might be pregnant, the safest course of action is for that individual to avoid being involved in taking radiographs on animals. This will reduce risk to the fetus and allow her doctors to perform any diagnostic x-rays that might be necessary during the pregnancy without putting mother and baby at any additional risk.

Chemical Exposure

According to the Occupational Safety and Health Administration (OSHA) and the Centers for Disease Control (CDC), chronic exposure to anesthetic gases such as halothane and isoflurane has been shown to increase the incidence of spontaneous abortion and congenital abnormalities in female workers. In addition, the risks of liver and kidney disease are higher in frequently exposed individuals, which could, in turn, adversely effect reproductive capability. Prevention of problems should be aimed at reducing exposure to waste anesthetic gases by installing, utilizing and maintaining an appropriate scavenging system, checking for and repairing leaks in the delivery system regularly, using endotracheal tubes rather than face masks for gas delivery to patients, and avoiding areas where anesthetic gases are in use. Fortunately, this is not a risk that all wildlife rehabilitators are exposed to, and in most cases, it is one that is easily avoided.

Other chemicals such as formalin/formaldehyde, and pesticides (pyrethroids, organophosphates and carbamates) are all inherently toxic to living things. Even disinfectants that are routinely used and generally carelessly handled are useful specifically because of their ability to kill living organisms. Chemicals can be mutagenic (induce mutations), carcinogenic (cause cancer), teratogenic (result in fetal deformities), acutely toxic, flammable, explosive, and irritants of the skin or respiratory system. They should all be handled with caution. Read the label, and any other information provided with the product, and use it only as directed. Wear gloves rather than handling the chemical with bare skin, avoid splashing it into mucous membranes (eyes, nose or mouth), and wash thoroughly after any possible exposure. It is always safest to use chemicals such as these in well-ventilated areas to reduce the concentration of vapors.

Conclusion

It is apparent that there are a substantial number of potential occupational hazards to pregnant women in the profession of wildlife rehabilitation. It should be reassuring to note, however, that most of these risks are relatively easily avoided or prevented if a few precautions are taken. 1) While working in close proximity to wildlife species may expose an individual to a somewhat higher chance of infection with certain diseases, practicing strict and careful hygiene can mitigate most of that risk. Wear latex or rubber gloves when handling animals or cleaning animal housing and wash hands thoroughly with warm water and soap immediately afterwards and before any meals. 2) Wear clothes, shoes and protective equipment appropriate to the task at hand. Take rest breaks as necessary, avoid physical obstacles and lift heavy objects with the muscles of the legs, not the back, in order to reduce the risk of physical injury. 3) Avoid exposure to x-ray radiation and anesthetic gases, and use all chemicals as directed on the label. 4) Finally, if you are considering becoming, or already are, pregnant, inform your doctor of your wildlife rehabilitation activities and discuss the safety measures most appropriate for you.

Acknowledgements

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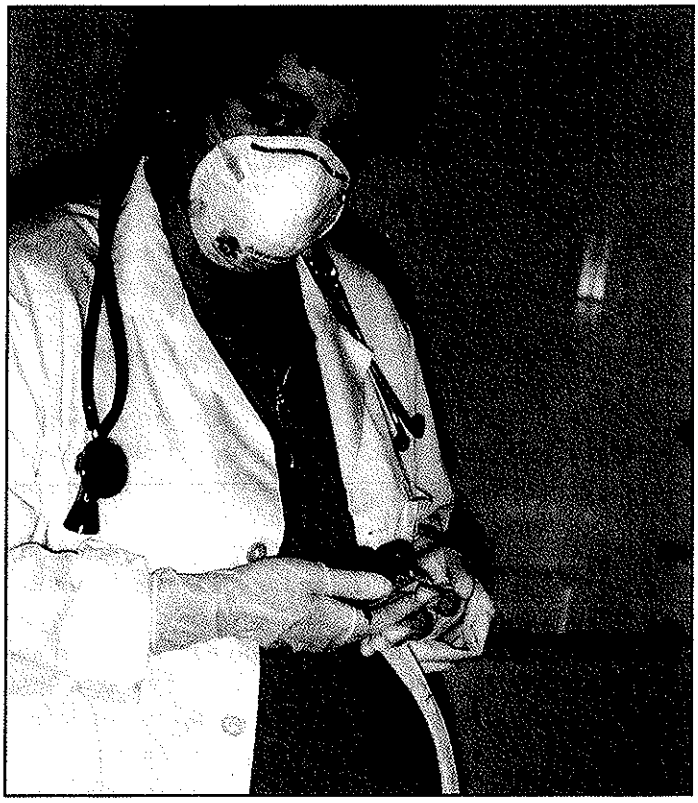
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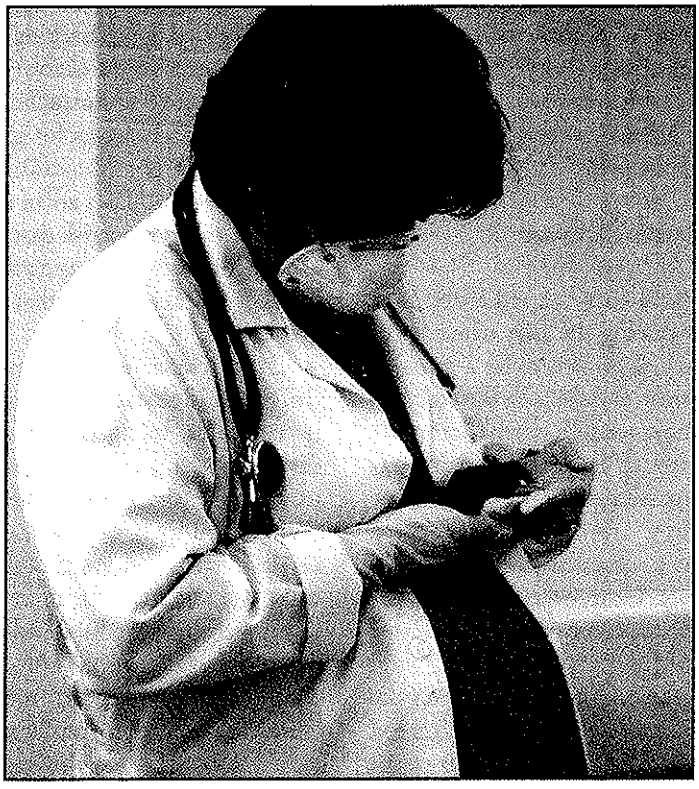
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Always wear proper protective clothing and safety equipment when working with animals. (Photo by Marge Gibson.)



Proper procedures are important for both the handler and the animal. (Photo by Marge Gibson.)

Phyto-Bezoar in a Captive Olive Ridley Sea Turtle (*Lepidochelys olivacea*)

By Carlos Roberto Hasbún and Luis Antonio Ramos

ABSTRACT: Physical examination of a captive juvenile Olive Ridley Sea turtle (Lepidochelys olivacea) from Barra de Santiago, El Salvador showed evidence of debilitation including a sunken plastron. Clinical history included, the patient eating but not defecating. Faecal examination for endoparasitism was negative for parasite ova and motile protozoa.

Considering the possibility of an obstruction in the digestive tract, treatment consisted of the oral administration of 25 mg albendazole in honey, mineral oil and water. Nifuroxacida antibiotic was also administered to prevent or reduce any possible digestive tract infection secondary to prolonged faecal retention. After three days of treatment, the patient excreted a large phyto-bezoar. Subsequently, the turtle began to gain weight. The phyto-bezoar was composed of Casuarina sp. pine needles. Recommendations were made to keep the turtle tank clean of any debris to prevent the ingestion of non-digestible material.

KEY WORDS: Olive Ridley Sea turtle, *Lepidochelys olivacea*, phyto-bezoar, Casuarina, intestinal obstruction, El Salvador.

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Introduction

All seven species of sea turtles are listed as endangered or threatened by the Red Book of the IUCN and under the Appendices of the Convention on International Trade in Endangered Species-CITES (Schouten, 1992). The over-exploitation and commerce of their eggs, shells, leather and meat, the incidental capture and death of adults and subadults by shrimp trawlers, and the destruction of their nesting habitats limit the probabilities of survival of sea turtle populations. Conservation measures are being developed worldwide. One strategy used by several biologists and conservationists involves headstarting neonatal and juvenile sea turtles in captivity to maximize their growth and development before being released into the open ocean, in hopes of increasing their survivability (Donnelly, 1994; Dodd, 1995; Klima and McVey, 1995; Reichart, 1995). The Sea Turtle Conservation Program developed at Barra de Santiago, El Salvador in 1989 by AMAR, a local non-governmental organization, has incorporated the headstarting of 30 turtles a year as an educational strategy geared towards promoting the sustainable use of sea turtle eggs. The 30 turtles in the study are held in a 4 x 1 m tank located on the local school's playground where students have free access to them. Turtles are fed fish once a day and the water in the their tank is changed after each feeding. Turtles are kept in the tank for 12 months and released each December through the development of a symbolic act. Approximately 75% of these turtles survive the year in captivity. Mortality in captivity has been associated mainly with mycosis and endoparasitism (C. R. Hasbún, unpublished).

Case History

On September 12, 1995, a captive-held juvenile Olive Ridley Sea turtle was found debilitated and with a sunken plastron. The turtle was observed feeding but defecation was not noted. The turtle was brought to the Wildlife Rescue and Rehabilitation Center of the Zoological Foundation of El Salvador-FUNZEL. The turtle's body weight was 298.2 g, with a curved carapace length (CCL) of 13.2 cm and curved carapace width (CCW) of 14.5 cm. Though the turtle was feeding, an evident weight loss was observed.

When treatment was initiated, feeding was discontinued. An impacted intestine with nematodes (*Ascaris* spp.), as had previously been reported from this captive-held population, was suspected (C. R. Hasbún, unpublished). A cloacal swab was taken and examined for endoparasitism. However, only a limited amount of faeces could be obtained and the faecal test proved negative. A 3 mm-diameter feeding tube was inserted orally into the turtle's oesophagus and 25 mg of albendazole was administered in 3 ml of water containing two drops of bee honey and one drop of mineral oil. Honey was included both as a carrier for the albendazole and to supply the patient with energy. The mineral oil was used as a GI lubricating agent. This same mixture was administered the next day, however, there was no evidence of defecation. Two days later, in view of the continued depressed state of the patient, 25 mg

of the antibiotic nifuroxacida was administered orally with water as a means of treating a possible infection due to faecal retention. The same day the turtle excreted a large 1.5 g phyto-bezoar consisting of needles of the *Casuarina* spp. pine (Fig. 1). Nifuroxacida is an antibiotic of the nitrofurans group that was chosen as treatment because it is a broad-spectrum antibiotic specifically indicated for gastrointestinal infections (Rosentein, 1990). As with most nitrofurans, it is not absorbed from the GI tract (Rosentein, 1990; Fraser and Mays, 1986); therefore, high antibiotic concentration could be obtained locally to reduce bacterial growth from faecal retention and a possible endotoxicosis.

Afterwards, the turtle was fed 5.5 g of fish (*Mugil curema*). Treatment with 25 mg nifuroxasida was again administered on the fourth day of treatment. After passing the phyto-bezoar, the turtle regained its normal swimming behaviour and passed a single, mucus rich and non-solid faecal pellet containing two small (4 mm) needle sections of *Casuarina* spp. On the fifth day, the turtle ate a single ration of 5.5 g of fish and passed one solid faecal pellet with some mucus. Subsequently, the turtle was given 3.5 g of fish twice daily and defecated a single pellet each day. On the fourteenth day of treatment the plastron had regained its normal condition. The patient was measured and its body weight was 400.5g. Figure 2 shows its physical condition before and after treatment; the turtle had gained 102.3 gm in 14 days.

Diagnosis and Discussion

The turtle's normal swimming and feeding behaviour was restored as soon as a phyto-bezoar was expelled. Normal defecation patterns were regained a few hours after bezoar expulsion, and faeces normal consistency was recovered within 24 hours after the turtle started self-feeding. Whether endoparasites might have contributed to the formation of the phyto-bezoar was not possible to ascertain, because even though a parasite faecal exam was negative, the obtained faecal material was not enough for a conclusive diagnosis. Neither was it possible to prove that resolution of clinical signs was due to antibiotic treatment or passing of the phyto-bezoar. However, considering that no other turtle in the tank became ill, an obstruction of the digestive tract with a phyto-bezoar was diagnosed.

Due to limitations of facilities and resources at FUNZEL's Wildlife Rescue Center, diagnosis could not be supported with lab exams, such as blood and radiographic tests. However, adequate veterinary procedures should include such tests to attain an accurate diagnosis. A simple haemogram could indicate the presence or absence of an infection to justify the use of antibiotic therapy, while a radiographic exam (with and without contrast media) could help visualize a gastrointestinal obstruction. Efforts must be made at FUNZEL to implement lab exams as part of routine procedures.

The phyto-bezoar expelled by the turtle was composed of *Casuarina* spp. needles. A phyto-bezoar is characterized by a hard indigestible mass of material such as hair (tricho-bezoar) or vegetable fibres (phyto-bezoar), located in the digestive tract of animals, mainly ruminants (Osol, 1983). To the best knowledge of the authors, phyto-bezoars in sea turtles have not been previously reported. During their first years of life in the open ocean, juvenile turtles are pelagic and, due to their omnivorous behaviour at this time, consume a wide variety of floating vegetation, including Sargassum algae (Carr, 1986). Plastic, tar and other debris have also been reported ingested by free-living juvenile marine turtles (Brongersma, 1968; van Nierop and den Hartog, 1984). This captive-held turtle from Barra de Santiago exhibited similar feeding behaviour and ingested floating *Casuarina* pine needles that had accidentally fallen into the tank. Since undegraded *Casuarina* spp. needle sections in turtle faecal pellets were frequently observed by the tank keepers, it is probable that Olive Ridley Sea turtles cannot digest them. If ingested in considerable amounts, the possibility of phyto-bezoar formation should be considered. Recommendations were made to trim the *Casuarina* spp. pine branches next to the turtle tank and to build a transparent roof over the

PROGRAM DEVELOPMENT

The Sea Turtle Conservation Program was initiated in 1989 at Barra de Santiago, one of the most conserved coastal and mangrove estuary ecosystems in El Salvador. The program's main objective is to promote community based sea turtle conservation efforts. Sea turtle eggs in El Salvador, as in most tropical countries, have a high demand due to their flavor and erroneously attributed aphrodisiac powers. Because of this, eggs from the study site were collected and sold by local fishermen before the development of the program. Considering the lack of legislation relating to sea turtles at that time, environmental education was the only feasible instrument to promote conservation. But how to promote sea turtle conservation through the incubation of their eggs if very few adults and absolutely no children in the community had even seen a turtle hatchling? For most, turtle eggs were just eggs and not turtles, making it difficult to relate the decline of adult nesters to the over-harvest of turtle eggs. A hatchery and tank were constructed at a local school where eggs are incubated and hatchlings headstarted. Being actively involved in turtle conservation encouraged parents to bring 30% of the found eggs to the hatchery built by their children attending the school. Children participate in caring for the hatchery and raising 30 hatchlings each year. (The rest of the hatchlings are released into the ocean immediately after hatching.) The headstarted turtles are released during Christmas each year through an activity with songs and ceremony called "Christmas Gift to the Ocean", in which the local community offers the juvenile survivors of the 30 turtles to the ocean in retribution for all the resources the ocean provides for them (approximately 75% of these turtles survive a year in captivity). Through this involvement, local people have bridged the gap between the decline of adult turtles and the harvest of their eggs, and many are presently involved in wildlife conservation in their locality.

tank to prevent debris from falling into the water. The turtle described in this report, following its successful treatment, was released three months later, together with the others being held in the tank, 5 km offshore of Barra de Santiago beach. Upon release the turtle was observed swimming vigorously into the depths of the Pacific Ocean.

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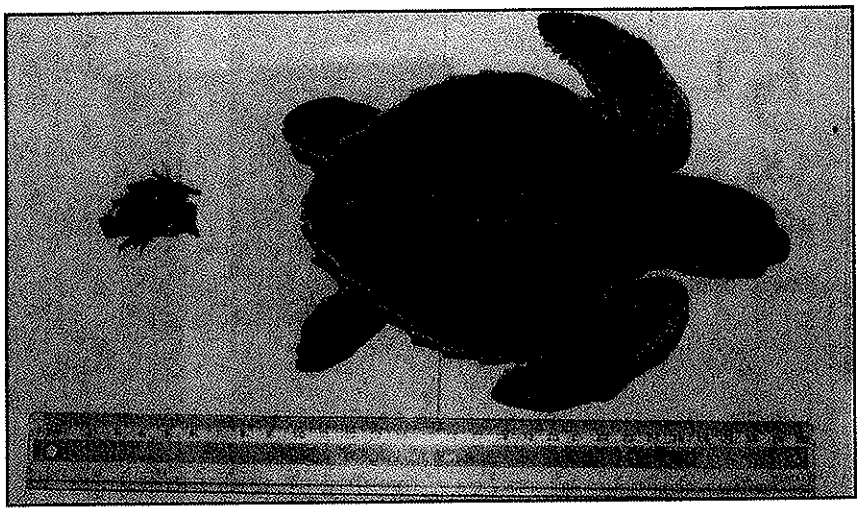
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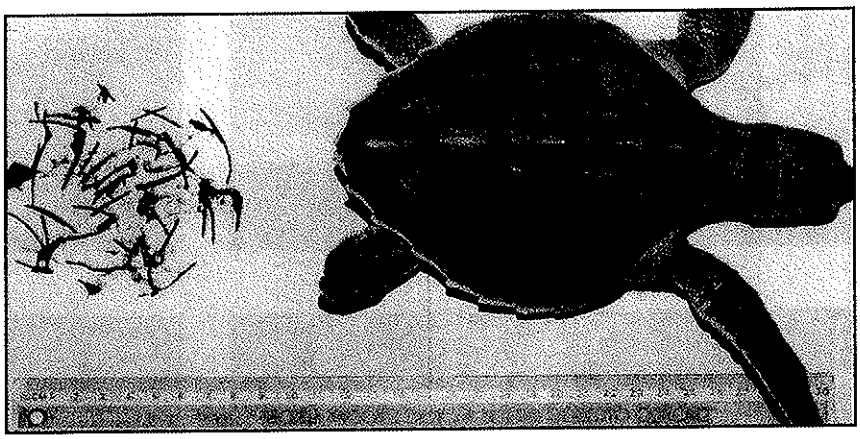
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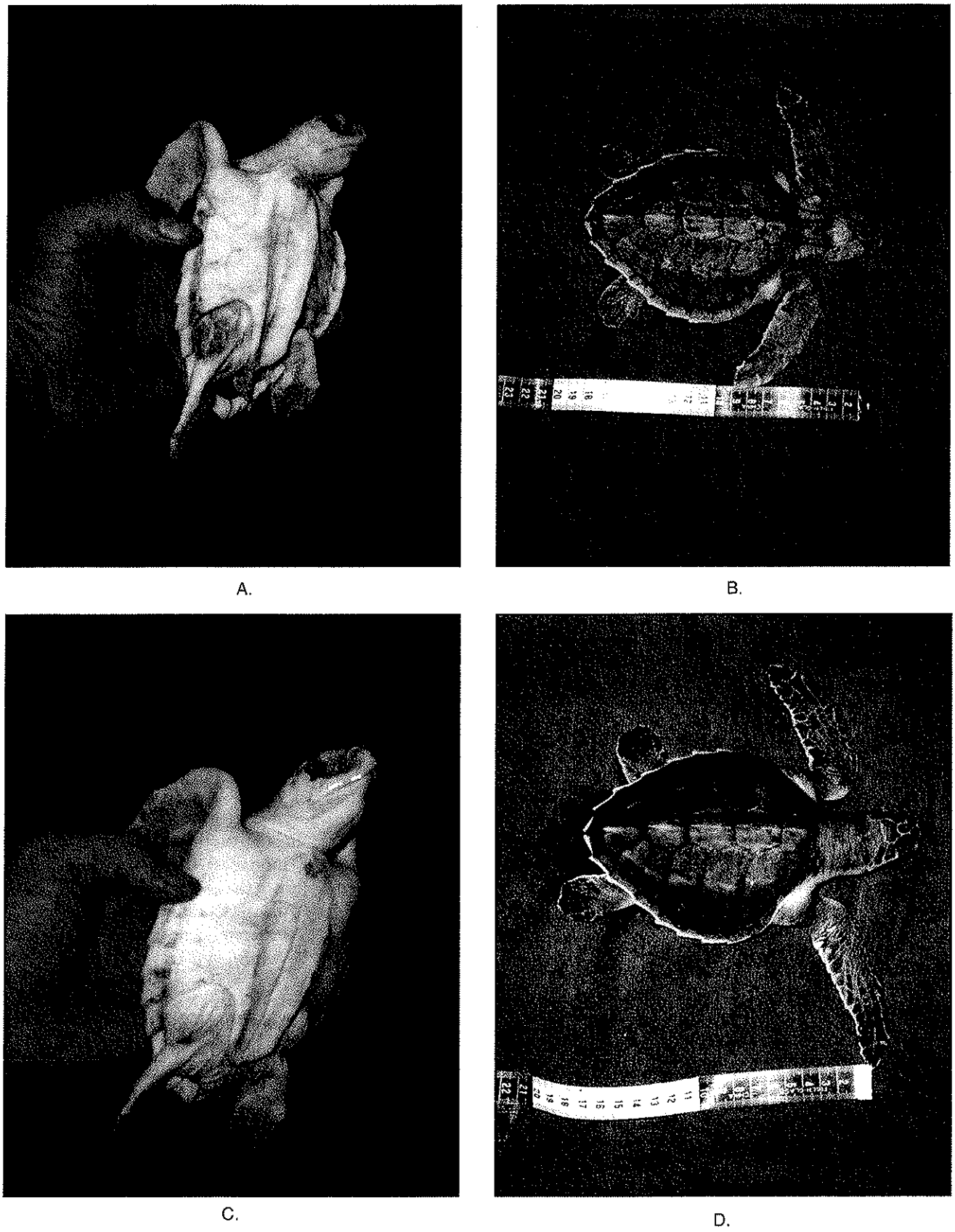


Figures 1A and B: Show 1.5 g bezoar consisting of leaves of *Casuarina* pine, excreted three days after mineral oil and albendazole treatment initiation.
(Photos by C.R. Hasbún.)

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A. B. C. D.

Figure 2. Pictures A and B were taken upon arrival at the Wildlife Centre. Pictures C and D were taken 13 days after treatment. Notice the difference in sizes, plastron conformation and neck width. (Photos by C.R. Hasbún.)

Dorsal Proximal Intertarsal Subluxation in an Adult Red Fox: Case Study

By Tracey Neff

ABSTRACT: An adult red fox (*Vulpes vulpes*) with a proximal intertarsal subluxation of the left hock joint was treated nonsurgically and successfully released. This article details the diagnostics and medical management of the orthopedic and soft tissue wounds.

KEY WORDS: Red fox, *Vulpes vulpes*, subluxation, splinting, wound management, wildlife rehabilitation, intertarsal joint

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History

A young adult male red fox (*Vulpes vulpes*) was presented to the Wildlife Center of Virginia (WCV) on 3/7/98 after being injured in a padded leghold trap. The trap itself did not harm the fox, but the anchoring chain was wrapped around the fox's left hindleg, resulting in significant swelling at and below the hock joint. The referring veterinarian's radiographs were viewed before the fox was examined. Regular mediolateral and anterioposterior views revealed no fractures or dislocations, but a stressed mediolateral view showed a dorsal proximal intertarsal subluxation (see diagram for anatomy). This is an uncommon injury in domestic dogs; it is a self-compressing injury that is relatively stable during the weight-bearing phase of the stride and less stable during the swing phase. The affected animal usually stands normally because the plantar ligaments are undamaged, but subtle lameness and soft tissue swelling are invariably present. The lameness is more pronounced if the medial or lateral collateral ligaments are damaged. Coaptation in a half-cast or plantar splint for 4-6 weeks usually works well if there is no concurrent lateral or medial instability. Surgical repair is indicated if coaptation is unsuccessful or if collateral ligament injury is present.

Physical Examination

Physical examination under isoflurane anesthesia showed a healthy, 4.3 kg animal with a severely swollen distal left hindleg. No fractures were palpated, but the leg could be abnormally bent caudally at the proximal intertarsal joint. There was no lateral instability, however, which indicated that the collateral ligaments were intact. Numerous ticks were attached around the eyelids and ears. Also, both ears had a heavy, crusty, black exudate that was positive for ear mites (*Otodectes cynotis*) under microscopic examination. Blood was drawn from a cephalic vein and submitted to the local human hospital for a complete blood count (CBC) and serum chemistry panel. Urine collected via cystocentesis was grossly bloody, so it was submitted for a full urinalysis and culture/sensitivity. A fecal sample was negative for intestinal parasites.

Initial Treatment

Initial treatment consisted of a Robert Jones bandage anchored above the stifle with 2" wide cloth tape (Zonas). Supportive bendable aluminum splints were placed cranially and caudally over the hock for additional stabilization. Dexamethasone (0.5 mg/kg IM) was given to alleviate soft tissue swelling,

and enrofloxacin (Baytril, 5 mg/kg IM) was started because of the bloody urine and strong possibility of incipient infection at the trauma site. The ears were cleaned and all ticks were manually removed. Ivermectin (Ivomec, 0.3 mg/kg SC) was given as a miticide. To ensure both proper hydration and increased urine elimination to physically flush the bladder, the fox was given Lactated Ringer's solution (LRS, 200 cc SC) and then placed in a large pet carrier in a quiet hospital ward to recover. Food and water were offered later that morning when the fox was fully awake. Evening treatments consisted of repeated doses of LRS and Baytril.

The following day, the bandage was checked during morning treatments of LRS and Baytril and again at evening treatments, when the Baytril was changed to a 22.7 mg tablet hidden in a meatball of canned cat food. During the day, laboratory results were received. All CBC results were within reference ranges, but the chemistry panel had several abnormalities. An elevated glucose was probably due to stress, and a slightly increased blood urea nitrogen (BUN) probably resulted from mild dehydration. The significantly elevated serum glutamic oxaloacetic transaminase (SGOT, or AST) was almost certainly due to muscle inflammation/necrosis in the left hindleg. Abnormal urinalysis results included a cloudy appearance with increased numbers of white blood cells (WBC), bacteria and red blood cells (RBC) seen on sediment.

A second fecal done on 3/9 revealed roundworm eggs (Toxocara canis), so the fox was given fenbendazole suspension (Panacur, 50 mg/kg PO). The bandage was again checked twice daily during treatments of LRS, now administered only in the morning, and Baytril.

On 3/10 the fox was aneshetized with isoflurane and his bandage was changed. The overall swelling of the lower limb was decreased, but unfortunately several soft tissue wounds had developed because of pressure necrosis from the initial swelling. The dorsal metatarsal surface had 2 skin wounds 2 x 1 cm and 1 x 1 cm, respectively, with resultant tendon exposure. The fourth digit had an approximately 1 cm deep laceration that was actively bleeding after bandage removal, and the third and fourth digits were mildly discolored and cool to the touch. The laceration was cleaned with dilute Nolvasan, debrided and sutured with 2-0 Vicryl. All other wounds were cleaned and covered with silver sulfadiazine (Silvadene) cream and Telfa® pads. A Robert Jones bandage with splints was placed on the leg as before. Urine was obtained by cystocentesis and examined in-house; increased numbers of WBC, bacteria and RBC were found on sediment. The urine culture results were negative, even though bacteria had been seen in the sediment on two different occasions. Daily treatments with LRS and Baytril were continued.

The bandage was checked during treatments of Baytril the following two days (3/11 and 3/12), and on 3/13 the fox was anesthetized with isoflurane for a bandage change. Purulent exudate was present at all the wounds, and the dorsal metatarsal wounds had enlarged to approximately 2.5 square cm each because of skin sloughing. Samples of the exudate were submitted for culture/sensitivity in both aerobic and anaerobic media. The sutures on digit four were intact, although little healing was evident. The distal leg was still mildly swollen, but digits three and four were no longer discolored and cool. All wounds were cleaned and covered with Silvadene, but the Telfa® pads were replaced by 4" x 4" gauze pads that hopefully would wick away the purulent exudate. A Robert Jones bandage with splints was applied again. A fecal sample was negative for parasites. The fox was started on cefadroxil (Cefa-Drops, 22 mg/kg PO BID) in addition to Baytril to provide coverage for possible anaerobic bacterial wound infection.

The following two days (3/14 and 3/15), the fox was continued on the two antibiotics and had his bandage checked daily. Also, during the day he was placed outside in his crate in a secluded spot in an effort to decrease stress.

On 3/16 the fox was put under isoflurane for another bandage change. A general physical exam on the fox was within normal limits, and his weight had increased to 4.5 kg. The metatarsal wounds had good granulation beds present; the sutures on digit four had dehisced, but deep healing was evident. Purulent exudate was still present on all wounds, so the Nolvasan and Silvadene topical treatment was continued. A Robert Jones bandage with splints was placed on the leg as previously. Repeat CBC values were all within reference ranges, and the SGOT was only mildly elevated on the chemistry profile. The previously elevated glucose and BUN values had returned to normal. Preliminary culture/sensitivity results indicated growth of *Pseudomonas* spp. and *Enterococcus* spp., with no growth apparent in the anaerobic culture medium. Because of this, the Cefa-Drops were discontinued, and the fox was started on amikacin (Amiglyde-V, 22 mg/kg IM BID) because it is effective against *Pseudomonas* spp. Amikacin is an aminoglycoside antibiotic, and all aminoglycosides have the potential for nephrotoxicity (kidney damage). However, compared to gentamicin, which is another aminoglycoside,

amikacin has a decreased nephrotoxic potential. Patient hydration must be closely monitored, though, and kidney values should be checked every 5-7 days. Because the fox had normal BUN and creatinine values, we felt comfortable in beginning amikacin therapy. Baytril was continued to broaden the antimicrobial spectrum.

On 3/17 the bandage was checked and Baytril and Amiglyde-V were given. The final culture/sensitivity report was faxed on 3/18, and no *Pseudomonas* spp. were isolated. The organisms isolated from the exudate sample were *Enterococcus durans* and *Bergeyella zoohelicum.* A third organism reported was *Staphylococcus* spp. that was thought to be a probable contaminant from skin normal flora. *E. durans* was sensitive to ampicillin, while *B. zoohelicum* was sensitive to enrofloxacin. Based on these laboratory findings, the amikacin was replaced by amoxicillin (22 mg/kg PO BID).

Treatments on 3/19 and 3/20 included amoxicillin and Baytril; a second dose of Ivomec was administered on 3/20 as a miticide for *Otodectes cynotis.* Rather than anesthetizing the fox with isoflurane for a bandage change, a length of orthopedic stockinette was placed over his eyes and ears to decrease stimulus from the ambient environment, and no one was allowed to speak while working on the fox. All wounds were covered with good granulation beds, but there still was purulent exudate. The lesions were cleaned with dilute Nolvasan, but the Silvadene and 4" x 4" gauze squares were replaced by a wet-to-dry bandage in an attempt to remove infected and necrotic tissue. Once again, a Robert Jones bandage with splints was the final layer. Because a wet-to-dry layer was included in the overall bandage, changes were increased to daily rather than every 2-3 days as before.

The bandage change on 3/21 was done with the fox awake and hooded. The lesions had a significantly decreased amount of purulent exudate, but unfortunately a new wound was present on the calcaneal tuberosity. The reason for this new wound was unclear, but it was speculated that it developed because the tuberosity is a bony protuberance, which makes it more prone to decubital ulcers (pressure sores). The skin had sloughed, exposing the underlying bone, and the Achilles tendon was moderately swollen. The wounds were cleaned and covered with a wet-to-dry layer, followed by a Robert Jones bandage with splints. From 3/22 to 3/31, the fox received amoxicillin, Baytril and daily bandage changes as treatments. All lesions were healing well, but slowly. From 3/24 on, the wet-to-dry layer was replaced by the Silvadene/gauze layer formerly used. On 3/29 the subluxation palpated very stable; the proximal intertarsal joint no longer bent caudally at a 90° angle, so the splints were discontinued and the Robert Jones bandage was altered to a lighter protective wrap. Even though it was only three weeks since admission, we felt comfortable removing the padded bandage and splints because the fox would be kept in a confined space to allow for soft tissue healing, thereby decreasing the likelihood of re-injuring the joint.

On 4/1 the toes distal to the bandage were very swollen and ulcerated because the fox had chewed and twisted the bandage layers overnight. The lesions were treated with Nolvasan and Silvadene, and a loose bandage incorporating the toes was applied. Dexamethasone (1 mg/kg IM) and butorphanol (Torbugesic, 0.4 mg/kg IM) were given to decrease inflammation and provide pain relief, respectively. By the next day, the toes were back to almost normal size. The metatarsal and digital lesions had healed completely by this time. The calcaneal lesion had a good granulation bed, but the wound was exudative and very little contracture had occurred. It was thought that perhaps daily bandage changes were preventing skin contracture, so from 4/3 to 4/21 the bandage was changed every other day. The wounds were treated with Nolvasan and Silvadene, and amoxicillin and Baytril were continued. On 4/9 exudate samples from the hock wound were submitted in aerobic and anaerobic culture media. The results on 4/15 reported two different bacterial species isolated, *Escherichia coli* and *Enterococcus fecalis.* Neither organism was susceptible to enrofloxacin, so the Baytril was discontinued. *E. coli* was sensitive to amikacin and *E. fecalis* to ampicillin, so Amiglyde-V was reinstituted at the same dose as previously used, and ampicillin was started at 22 mg/kg PO BID. Because of the amikacin, the fox's hydration was closely monitored and kidney panels were performed on 4/18 and 4/21; all values were within reference ranges.

When the bandage was changed on 4/22, there still was unsatisfactory wound contracture. The antibiotics were stopped and additional samples were submitted for culture/sensitivity. The wound was treated with Nolvasan and Silvadene, and the bandage was changed every other day until the microbiology results arrived on 4/24. Only *E. coli* was isolated this time, and although the sensitivity results were identical to the 4/15 report, a different effective antibiotic was chosen since amikacin had not eliminated the microorganism from the hock wound. Ceftazidime, a third-generation cephalosporin, was given from 4/24 to 5/4 at a dose of 20 mg/kg IM BID. During this period, the bandage was changed every other day, and the lesion was treated with Nolvasan and Silvadene. On 5/

9 the foot was very swollen because the bandage had tightened overnight, but fortunately the wound was not adversely affected. Cold compresses were applied for approximately ten minutes BID, and the distal leg was loosely wrapped. No systemic anti-inflammatory agent, either steroidal or nonsteroidal, was given. The foot was back to nearly normal size the following day, and some wound contracture was evident. No exudate had been present for the past several days, so a semi-occlusive transparent bandage material (Tegaderm) was applied over the hock granulation bed to stimulate continued contracture. To closely monitor the lesion, bandage changes were performed daily from 5/9 to 5/25, when the wound was finally covered entirely by skin. Mediolateral and anteroposterior radiographs of the distal left hindleg taken under isoflurane anesthesia showed bony thickening of the calcaneal tuber and moderate soft tissue thickening around the hock joint.

On 6/2 the fox was taken outside to a flight pen to evaluate his gait. Because there had been no fracture or neurologic injury, there was little muscle atrophy that occurred during the lengthy rehabilitation. The fox was very quick and agile, with no residual deficits detected. He was scrambling frantically, trying to find a way out of the flight pen, so he was quickly captured to prevent any further injury and placed back in his crate to await release. On 6/11, three months after the fox was admitted to the WCV, he was released in the same location that he had been found. Before he was returned to the wild, the fox had a radio collar placed and tested. A film crew from "Wildlife Emergency," the television series filmed at the WCV for the Animal Planet cable channel, was present to record the release. As the hood was removed, the fox was nothing more than a blur with a bushy tail as he left us all behind to continue his life as a wild animal.

This case report highlights the importance of diligent wound care and rational antibiotic selection. Bandages must be checked daily and changed as often as deemed appropriate by a veterinarian or an experienced rehabilitator under the supervision of a veterinarian. Just because a lesion is covered by a bandage does not ensure that it is healing properly underneath. If not used properly, antibiotics may be detrimental rather than beneficial. Culture/sensitivity results are the ideal way to select an antibiotic, but in their absence, knowledge of an antibiotic's mechanism of action and antimicrobial spectrum are crucial to successful rehabilitation. Finally, it is likely that in a domestic animal these soft tissue wounds would have healed much more quickly. In a wild animal kept in captivity, however, never underestimate the power of stress.

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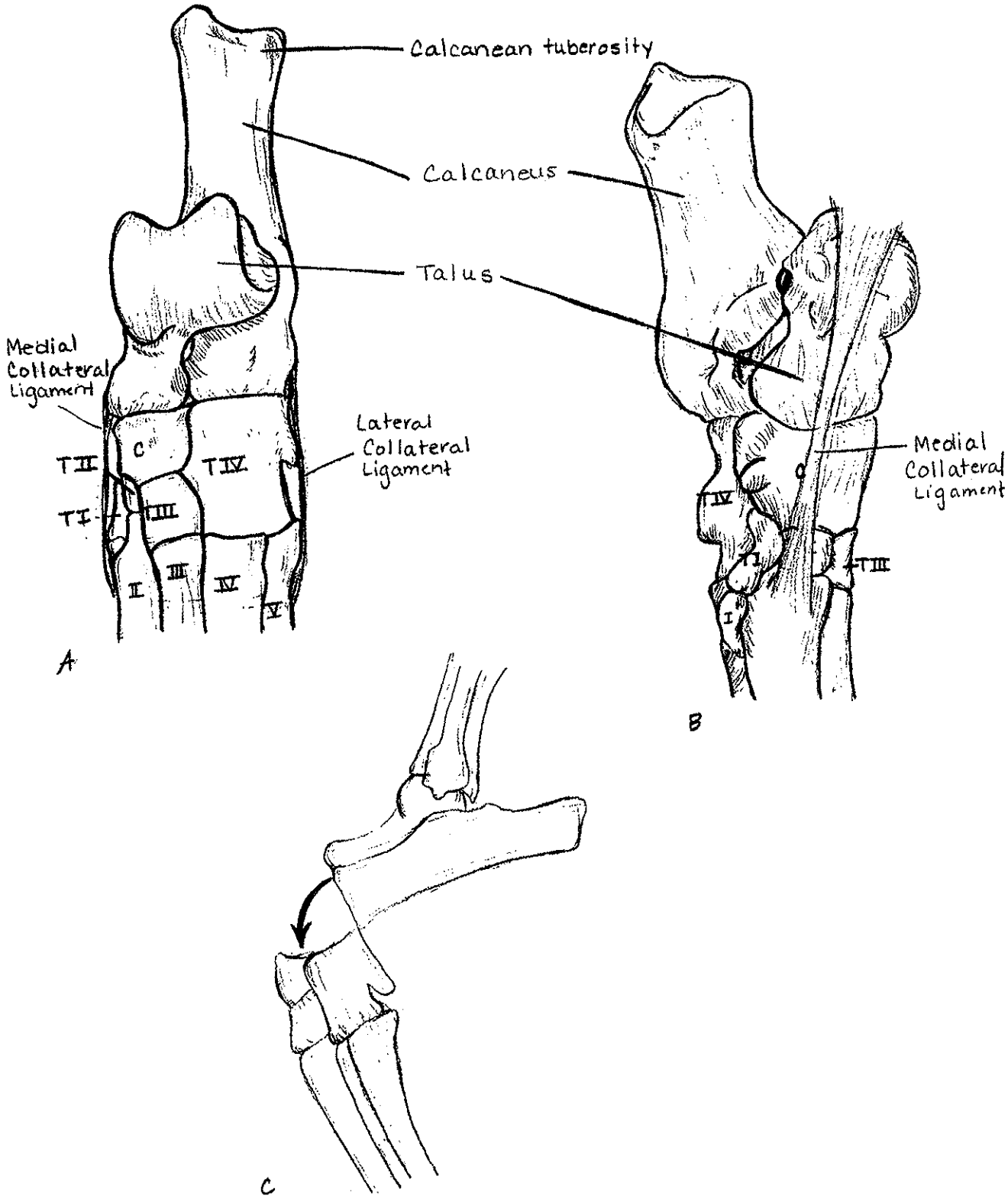
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Glossary

Anaerobic—an environment devoid of oxygen
Anteroposterior—going from the front surface to the back surface, again referring to radiation beam direction
Cephalic—the major vein in the distal foreleg
Coaptation—the bringing together of two or more structures; an external device applied to realign and stabilize a fracture or other orthopedic injury
Cystocentesis—a procedure involving the introduction of a needle (attached to a syringe) into the urinary bladder to obtain a sterile urine sample
Dehiscence—the separation or breakdown of a surgical site
Granulation—a type of tissue that forms during the early stages of wound healing
Mediolateral—going from the inside surface to the outside surface; in this article it refers to the direction the diagnostic radiation beam travels through tissue
Miticide—a chemical that kills mites
Plantar—the bottom surface of the distal hindleg
Pressure necrosis—cell death resulting from swelling; the swelling interrupts normal blood flow to the region, thereby depriving cells of oxygen and other nutrients
Robert Jones bandage—a heavy padded bandage applied below the elbow or hock joint to immobilize a fracture
Semi-occlusive—the property of allowing passage of only certain substances; a semi-occlusive bandage allows passage of air but not fluid or bacteria
Subluxation—an incomplete or partial dislocation of two or more adjacent structures



Bones and ligaments of the tarsus. A. Dorsal aspect; B. Medial aspect; C. Dorsal proximal intertarsal subluxation (lateral aspect). C, central tarsal bone; T I-IV, numbered tarsal bones and I-V, numbered metatarsal bones.

FOR THE REHABBER

Fubar: The Use of Veterinary Acronyms in Wildlife Rehabilitation

By Edward J. Gentz, MS, DVM, DACZM, Iris Arink, and Sarah E. Snead, LVT

Veterinarians, like the military, love to use acronyms. Acronyms are words formed by combining the initials of the words of a longer phrase, such as VIP for "very important person", or SOL for "sorry, outta luck." Although military acronyms tend to be more, shall we say, colorful, they often find their way into popular usage when military personnel continue to use them after they return to civilian life. Many people have probably used the word "snafu" to describe a situation where something has gone awry, not realizing its origin as a military acronym meaning "situation normal—all 'fouled' up". Similarly, the popular acronym in this article's title is short for "fouled" up beyond all recognition.

Veterinarians, in their efforts to reduce the amount of writing required in maintaining prodigious numbers of medical records, also have a tendency to use shortcuts such as acronyms and abbreviations as much as possible. Cats get diseases such as FIP (feline infectious peritonitis) and FELV (feline leukemia virus). Dogs have orthopedic problems such as UAP (ununited anconeal process) and OCD (osteochondritis dissecans). Cows get MCF (malignant catarrhal fever).

Clear and unambiguous communications between wildlife rehabilitators and their veterinarians is essential if the passage of the information essential to the successful rehabilitation and release of the wildlife in their care is to be accomplished. Heaven knows some veterinarians are better than others in verbally communicating veterinary medical information in a fashion understandable to the lay person. Veterinary handwriting notwithstanding, deciphering veterinary records, or merely the written instructions from veterinarians to rehabilitators, can be daunting sometimes.

The Wildlife Center of Virginia has developed a short in-house dictionary of sorts in order to enable the myriad of interns, externs, preceptors, volunteers, visiting students, rehabilitation staff, outside rehabilitators, lay hospital and other miscellaneous staff, even administrators and board members, with whom we deal to better understand the copious jargon-filled medical records generated daily. We hope that sharing this lexicon will facilitate communication between veterinarians and the wildlife rehabilitation community. Most of the acronyms included in the following list are standards in common veterinary usage. Most of the unique abbreviations specific to our facility have not been included. The following list is not necessarily inclusive, and doubtless, other rehabilitators and veterinarians can think of worthy additions to expand our short list. We encourage you to do so.

ac•ro•nym
A word formed from the initial letters of a name, as *IWRC* for *I*nternational *W*ildlife *R*ehabilitation *C*ouncil; or by combining initial letters or parts of a series of words, as *radar* for *ra*dio *d*etecting *a*nd *r*anging.

Veterinary Acronyms and Abbreviations List

ABX	= antibiotics
AB3	= triple antibiotic ointment
AB3-HC	= triple antibiotic/steroid ointment
AD	= right ear
ADR	= ain't doing right
AS	= left ear
AU	= both ears
BAR	= bright, alert, responsive
BARF	= bright, alert, responsive, feisty
BC	= body condition
BDG	= bandage
BID	= twice a day
CBC	= complete blood count
CNS	= central nervous system
CW	= crop wash
DDX	= differential diagnosis
DV	= dorsal ventral
DX	= diagnosis
EDTA	= purple blood tube anticoagulent
EOD	= every other day
FF	= force feed
FL	= front leg
FX	= fracture
HBC	= hit by car
HCT	= hematocrit (=packed cell volume)
HF	= hand feed
HL	= hind leg
HR	= heart rate
IC	= intracardiac
IM	= intramuscular
IO	= intraosseous
IP	= intraperitoneal
IV	= intravenous
JNT	= joint
LAC	= laceration (cut)
LRS	= lactated Ringers solution
MM	= mucous membranes (i.e., gums)
NAF	= nothing abnormal found
NSF	= no significant findings
NSL	= no significant lesions
NX	= necropsy
OD	= right eye
OO	= ophthalmic ointment
OS	= left eye
OU	= both eyes
PCV	= packed cell volume
PE	= physical exam
PO	= per os (orally, by mouth)
PT	= physical therapy
PX	= prognosis
QAR	= quiet, alert, responsive
QID	= four times per day
RAD	= radiographs (x-rays)
RBC	= red blood cells
ROM	= range of motion
RR	= respiratory rate
RT	= right
SID	= once a day
SQ	= subcutaneous
ST	= soft tissue
SX	= surgery
TEG	= Tegaderm (bandage material)
TEMP	= temperature
TF	= tube feed
TID	= three times per day
TMS	= trimethoprim sulfamethoxazole (an antibiotic)
TP	= total protein
TX	= treatment
VD	= ventral dorsal
WNL	= within normal limits
WBC	= white blood cells

Case Study: A Great Blue Heron a Leg-hold Trap and a Little Bit of Luck

By Marjorie J. Gibson

ABSTRACT: Injuries caused by leg-hold traps are among the most serious and difficult ones with which wildlife rehabilitators and veterinarians have to deal. Complications occur not only from the crushing injuries that are sustained, but also from shock, exposure, injury caused by predators, or attempts to flee the trap. All these factors can play varying roles in the treatment. Injuries occur when non-target wildlife, such as birds, wander into leg-hold traps placed by fur trappers for mammal species. Occasionally, because of discovery soon after entering the trap or having debris pad the trap, birds can come away with relatively minor injury. The target species was river otter (*Lutra canadensis*); the non-target species, a Great-blue Heron (*Ardea herodias*).

KEY WORDS: soft-tissue injury, steel jaw trap injury to non-target species, wading bird injuries, tarsometatarsus

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Introduction

Life can be filled with danger for wildlife. Many problems are naturally occurring, such as predators, weather or food availability. Other problems derive from interaction with man. This case study concerns a Great-blue heron (*Ardea herodias*) that was caught in a legal leg-hold trap set by a fur trapper for river otter in North-central Wisconsin.

History

At 6:35 am on April 10, 1999, a call was recorded on the answering machine. A woman relayed information about a heron flailing in a ditch with what looked like a broken wing. She left her name and telephone number, but was not at the number when the call was returned. The message did not include the location of the bird, leaving the author with the uneasy feeling the woman might try to capture the bird herself. Great-blue herons have dagger-like beaks that can inflict serious injury to someone trying to "help" it. It could only be hoped that she was aware of the danger. At 8:00 am, the local Department of Natural Resources (DNR) office called to say they had a Great-blue heron wrapped in a blanket. Within fifteen minutes, our local warden brought it to the rehabilitation center. The blanket in which the bird was wrapped was soaked with blood.

The bird was alive, although its breathing was shallow. Usually a high-strung species, this Great-blue seemed in shock as it lay, neck and legs folded, not even moving after it was free of the wrap.

The heron had been trapped in a double spring Victor trap #4, designed for trapping river otter. The rescuer had retrieved the trap when the bird was recovered from the side of a stream. The trap was turned into the DNR at the same time as the bird. Luck had been with the bird even as it was trapped. A large clump of dried grass softened the snap of the jaws on the foot. The result was a laceration of the tarsometatarsus instead of the usual crushing fracture that occurs with smaller non-target species. Had the trap been clear of debris, the injury could have been much more severe. Another stroke of luck, the incident occurred near a well-traveled county road, which facilitated finding the bird more quickly.

Examination

Examination revealed the injury to be a laceration of the extreme distal tarsometatarsus with some involvement of the soft tissue proximal to the digits. The injury site was still actively bleeding, but clotting had begun.

The bird was a small adult, with well-developed muscle and was well fleshed. Being at the low end of the weight range suggests the bird was a female (Terres, 1995).

The only visible injury was a transverse laceration of the left tarsometatarsus. The 1-cm laceration was located on the anterior aspect of the left distal tarsometatarsus, and extended 3-4 mm deep into the underlying soft tissue. The extensor tendons were not involved. Moderate bleeding continued from

the site during the time of the exam.

Physical Exam

Weight: 2.4 Kilos
Oral Cavity: Mucous membranes pale, off white in color. Dry. No visible parasites in the oral cavity.
Nares: Normal
Eyes: Normal in appearance and reaction to light, movement.
Ears and canals: Normal
Body: Well-fleshed individual. No obvious sign of injury to body.
Wings: Both right and left appear to be normal. No signs of injury or feather loss.
Legs:
Right leg: Normal in extension and appearance.
Left leg: Normal in extension and appearance.
Tarsometatarsus/Digits:
Right tarsometatarus: Normal in appearance.
Left tarsometatarus: 1 cm transverse laceration of anterior aspect of distal tarsometatarsus. Extensor tendons not involved. Moderate bleeding noted time of exam. Some swelling of all digits noted.
Feathers: Well feathered, no ectoparasites noted.

X-rays

Negative for fractures. Soft tissue swelling apparent, involving all digits.

Blood Work

Packed Cell Volume: 29%
(Normal range 40-42%)
Hemoglobin: 9gms
(Normal range 13.0-14.5 gms)

Initial Treatment

The injured foot was washed thoroughly with warm water and Betadine antiseptic soap solution. Pressure was applied to the injury site to halt the bleeding. Topical antibiotic ointment was applied and covered with a synthetic non-adherent dressing. The foot was wrapped with Vet-wrap™ to protect the injury site from environmental or fecal contamination.

The bird was tubed with 40 cc of electrolyte fluid and Avitron™ vitamin-enriched water twice the first hour following admission. Because of the species' propensity to vomit when stressed, it was decided to attempt moderate amounts of fluid, holding the bird's beak upright until the fluid could be absorbed from the crop. After the second feeding, the bird was active and beginning to show signs of stress from handling.

The bird was put in an 8'x8'x8' indoor recovery enclosure. It was observed by an individual hidden from view to monitor activity and ascertain that the bird was taking water and eating. Water was provided in a tall container, which allowed drinking but did not permit the bird to put its feet into the water, possibly causing wound contamination.

Follow-up

The injured foot was soaked in warm water for fifteen minutes daily for the first five days and every other day for the next six days. The dressing on the foot was similarly changed daily for the first five days, then every other day the next six days. The procedure for dressing the wound followed that of the initial care of the wound, using antibiotic ointment covered with a non-adherent gauze pad and finally Vet-wrap™ to secure the bandage and protect the injury site. The laceration healed well and uneventfully. The swelling resolved more gradually.

The bird was not given systemic antibiotics as the wound responded well to the topical treatment alone.

During confinement, the bird was maintained in an 8'x10'x8' recovery enclosure. The enclosure was indoors and followed guidelines for raptor housing: the sides constructed of solid plywood and the front and ceiling of the caging consists of vertical 1"x1" boards. No wire was used as herons are very active birds and tend to sustain feather damage and other injuries when confined in wire enclosures.

The bird was tube fed three times/day with 60cc of Pedialyte™ mixed with two 2-1/2-oz. jars of Gerber's® baby meats. Each jar of baby food contains between 70 and 90 kcal, depending on variety of meat used. Whole killed mice and minnows were also provided during the initial confinement for purposes of self-feeding. However, while she did drink water on her own, she did not self-feed for the first seven days. After the first week, the heron began eating 3-4 killed mice and a half-pound of live minnows daily on its own. Tube feeding was discontinued when the bird began self-feeding.

On day eleven, the dressing was removed and the bird transferred to an outside enclosure with a pond. Privacy was maintained to keep the stress level to a minimum during recovery. A variety of food was offered to the bird daily, including killed mice (4-6/day), fish up to 12 inches long (2-3/day), frozen day old chicks (3-4/day), beef heart (4-8 oz.) supplemented with thiamin and Vita-hawk™ powdered vitamins and soaked Science Diet Canine Growth™ kibble. In consideration of capture stress and recovery from anemia following blood loss, the bird was provided with as much food as she could eat, allowing for some to be left uneaten each day. Uneaten food was removed at nightfall.

On day twelve the bird began selecting high (8 ft. plus) Astroturf covered perches for roosts. She appeared to put weight on each foot equally on day twelve, which continued until release. She ate well throughout her period of outdoor confinement.

Release

The bird was released on April 30, twenty days following the incident and her confinement. At the time of the release the wound was well healed and the swelling in the foot and toes had subsided. The bird was using the leg normally, perching and flying well.

The PCV (Packed Cell Volume) the day before release was 42%, within normal range.

While the release could have occurred a week sooner, the decision was made to delay putting the bird into the wild until the end of trapping season.

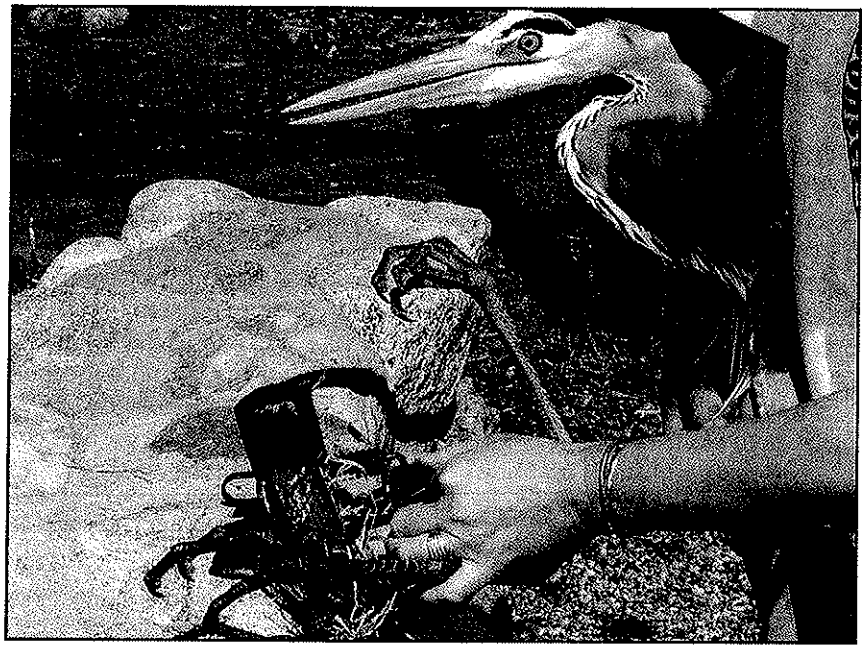
Discussion

Trap injuries are notorious for both the amount of tissue damage and the trauma accompanying the trapping incident. Non-targeted species are generally more fragile in limb than the species for which the traps are set and therefore suffer more extensive damage.

The Great-blue heron in this case was fortunate on several fronts. First, the jaws of the trap were blunted by a large clump of dried grass that actually surrounded the foot and served to hinder their closing. Second, the bird was found quickly following the incident, before it sustained additional injuries in its efforts to get out of the trap. Using established local networks for helping injured birds, it was taken to the DNR office and then to the rehabilitation center within an hour of being recovered from the trap. The complete history and the finder's willingness to remain involved with the case told us immediately what we were dealing with and treatment was not delayed while other considerations were made.

Conclusion

While all leg-hold trap injuries are serious, prompt discovery and removal from the trap along with treatment and supportive care during recovery are all major factors in a patient's speedy return to the wild. Wildlife rehabilitation is a cooperative effort. Educating the public to the existence of a wildlife rehabilitation center in their area, networking with their game department and even the trappers themselves, cannot be underestimated. Taken together, such networks can lead toward a greater number of positive outcomes and perhaps prevention of such injuries in the future.



Great-blue Heron caught in trap (Victor trap #4), designed for trapping river otter. (Photo by Don Gibson.)

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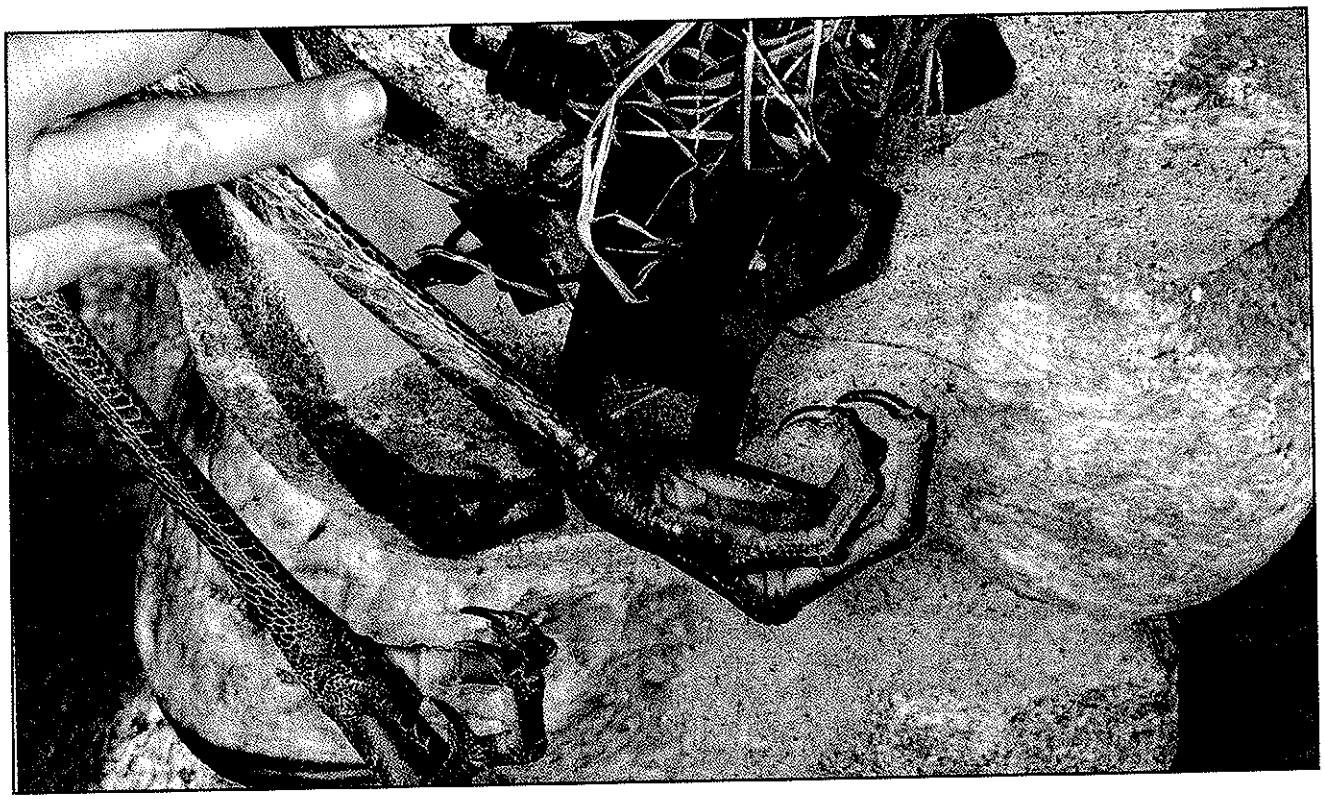
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The heron sustained a laceration of the tarsometatarsus. (Photo by Don Gibson.)



Heron's last seconds of captivity. April 30, 1999. (Photo by Don Gibson.)

The Wildlife Rehabilitation Task Force

Over the last two years, a group of wildlife rehabilitation professionals has been meeting as "The Wildlife Rehabilitation Cooperative Task Force" (WRCTF). Particular attention was given to the subject of wildlife rehabilitation regulations.

The WRCTF has developed a package of resource materials on wildlife rehabilitation regulations. The package includes: a Statement of Need and Justification of Wildlife Rehabilitation Regulations; a comparison of rehabilitation regulations from several state wildlife agencies; copies of those individual state rehabilitation regulations; A Wildlife Rehabilitator's Code of Ethics; a list of basic training curricula recommended for wildlife rehabilitators; and two articles written on rehabilitation regulations.

The task force strongly encourages wildlife agencies to involve wildlife rehabilitators in the development and revision of any rehabilitation regulations. Wildlife rehabilitators are not only significantly affected by any rehabilitation regulations, they have the relevant knowledge and experience to contribute to the process. The WRCTF has been encouraging and will continue to encourage wildlife rehabilitators to work closely and professionally with wildlife agencies.

The members of the WRCTF would like to thank the various wildlife agency staff who provided advice and input to this project, including Marlys Bulander, USFWS; Patrick Martin, NYS Dept. of Environmental Conservation; John Smeltzer, CO Division of Wildlife; Blair Joselyn, MN DNR; and David Dowling, VA Dept. of Game & Inland Fisheries.

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If you have any questions, please feel free to contact any of the task force members on the following list.

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A basic curriculum for wildlife rehabilitators

One of the topics discussed by the Wildlife Rehabilitation Cooperative WRCTF was the expectations of the basic knowledge of wildlife rehabilitators. They felt some basic components were important for all wildlife rehabilitators to know regardless of how they acquired that knowledge (e. g. workshops, apprenticing with experienced rehabbers, working with a veterinarian, individual readings, etc.).

It was generally agreed that each state would have different requirements based on their own regulations and situations (such as Rabies Vector Species [RVS] certification for those in rabies enzootic areas).

The group discussed the importance of the following basic knowledge for wildlife rehabilitators as appropriate for state permitting requirements or authorities:

- State and Federal Regulations affecting wildlife rehabilitation.
- Ethics of wildlife rehabilitation.
- Basic identification of wildlife species the applicant will rehabilitate.
- Natural history and behavior of wildlife species the applicant will rehabilitate.
- Humane solutions and problem prevention regarding wildlife.
- Safe capture and handling of wildlife species applicant will rehabilitate.
- Facilities/caging/habitat needs for the wildlife species applicant will rehabilitate.
- Diet and nutrition of wildlife species applicant will rehabilitate.
- Identification and general assessment of basic problems (not including diagnostics).

- Basic first-aid and problem solving of wildlife species applicant will rehabilitate.
- Wildlife diseases, including zoonoses.
- Euthanasia criteria and methods.
- Release criteria, considerations, preparation.
- Public contact (handling phone calls, getting info, receiving animals, education, etc.).
- Working with orphaned wildlife (including imprinting issues).
- Basic literature and informational resources and references.

Statement of need and justification for the regulation of wildlife rehabilitation efforts

Legal perspective

In the United States, native wildlife is generally considered to be a public trust resource, namely the property of the public. Regardless of where birds, mammals or other wildlife are found, the public at large has an ownership interest in their management and welfare. In most states, when individuals wish to reduce wildlife to private ownership through hunting, fishing, capture, killing or pursuit, it must be done within the limits of a publicly acceptable activity and done in a manner which is not contrary to the public interest.

In nearly all states, the statutory authority for the determination and administration of the public's interest in wildlife resources has been granted to a wildlife agency, game department, or similar structure within the administrative branch of state government. While the statutory mandate may differ both in language and specificity, in general, wildlife management agencies are charged with regulating the use of the public trust resource by individuals or groups of individuals. In most cases, the detailed system through which this delegated public interest is managed constitutes a body of duly adopted regulations, policies, and procedures.

By their very nature, regulations are designed to enable the management agency to define and maintain control over the public's interest in wildlife. Activities such as hunting, fishing, trapping, possession, and pursuit of wildlife are addressed specifically in regulatory language. The terms and provisions of regulations change with changing circumstances, including fluctuations in animal populations, management needs and priorities, as well as the values and opinions of the public at large. Many other influences are brought to bear on regulations as well, including economic, political and traditional forces.

The need to recognize and regulate wildlife rehabilitation activities

The public's attitude toward wildlife used to be primarily rooted in a utilitarian philosophy under which wildlife is a natural resource to be managed as any other resource, for the use and enjoyment of humans. Over the past twenty to thirty years, the public's attitude toward wildlife, and animals in general, has changed significantly. The public is increasingly concerned about the welfare of individual animals, whether wild or domestic. This concern is evidenced by the proliferation of standards and regulations concerning the humane treatment of animals as well as criminal sanctions against those who would torture, abuse, or neglect either livestock or companion animals.

The public's concern for the welfare of individual animals extends to wildlife in very tangible ways. As society has increasingly moved into wildlife habitats, the contact between humans and wild animals has increased dramatically. Inevitably, people encounter animals that have been injured or displaced either as a result of natural causes or more often through human activity. Today, the public expects the welfare of those injured or displaced animals to be addressed by society.

Over the last thirty years, a field of endeavor known as wildlife rehabilitation has emerged nationwide. Within this field, individuals and organizations provide temporary care to injured or displaced wildlife with the goal of returning the animals to the wild in a healthy, viable condition. Wildlife rehabilitators are increasingly recognized as a valuable resource to educate the public about environmental issues and stewardship. While the mandate for most state wildlife agencies is to manage ecosystems, populations, and species of wildlife, increasingly they are being called upon to regulate the care and possession of individual animals, as well.

The goals of wildlife rehabilitation regulation

Wildlife rehabilitation started as an endeavor through which individuals administered first aid and care in an improvisational way. However, over the last decade, a great deal of organizational improvement and professionalism has been brought to bear on the field. Now, those wishing to be involved in wildlife rehabilitation have the opportunity to benefit from extensive training, the use of a wide range of reference materials, and the experiences of many professional organizations created to support the efforts of rehabilitators.

While the philosophical and ethical foundation of wildlife rehabilitation is still rooted in a concern for the welfare of individual wild animals, the standards for competent ethical care have changed significantly in a number of ways. An understanding of how the individual animals interact with their populations, habitats, and ecosystems has become a vital part of the profession. Updated information and newly developed techniques are constantly evolving.

For more than a decade, two national membership organizations of wildlife rehabilitators, the International Wildlife Rehabilitation Council and the National Wildlife Rehabilitators Association, have led the effort to bring standardization and accountability to those involved with the care of injured and displaced wildlife. A code of ethics, guidelines for cage sizes, codes of conduct, accepted procedures, medical and nutritional reference materials have all been developed to guide wildlife re-

habilitation efforts. The standards help to ensure that the animals in the care of rehabilitators receive appropriate intervention to maximize their chances of a successful return to the wild. The ethical standards, facility guidelines, and nutritional goals represent standards to which all rehabilitators can, and should, aspire.

While the wildlife rehabilitation profession sets its own standards for excellence, it falls to state wildlife agencies to regulate the parameters within which this field of endeavor can be pursued and to set minimums below which no one will be permitted to go. The profession itself establishes those things which wildlife rehabilitators "should" do, while the regulatory system establishes those things that all wildlife rehabilitators "must" do.

In identifying and defining regulatory mandates, agencies must consider currently accepted standards within the profession of wildlife rehabilitation. They also must accommodate, within the regulatory framework, activities that can meet the public's demand that care be provided to injured or displaced wild animals. An effective regulatory system provides incentives and requirements for permitted individuals or facilities to remain current on advances within their field of endeavor and to employ those practices and techniques that maximize the chances of success for the rehabilitation effort. It is often difficult for an agency to craft regulation in such a precise way as to ensure that only competent people would seek to be involved in the permitted activity or that all facilities will meet or exceed national standards. However, a regulatory system can be established that maximizes the potential for these desired goals to be reached.

Features of an effective regulatory system

The regulation of any activity by a state wildlife management agency must be sensitive to the needs of wildlife, the expectations of the public within the state, the potential for the regulated community to achieve specific goals, and the limitations of available resources. However, with few exceptions, there are basic components of a regulatory system which can be included by all states that will do much to ensure that wildlife rehabilitation activities conducted under the regulatory framework meet or exceed nationally accepted minimums.

Such a regulatory framework would include the following:

1. A Statement of Purpose for the Regulatory Program. This would establish the intent of the regulation and cite the statutory authority under which the regulations are created. Typically, this section would include a statement indicating that the regulations allow possession of wildlife for the purposes of rehabilitating the wildlife and returning it to the wild. Further, the regulations should seek to establish the conditions under which the wildlife will be kept. They should also address the procedures that will be used to ensure the safety and welfare of the animals, as well as the protection of wildlife at large and the general public.
2. Definitions. If properly and thoroughly prepared, this section can eliminate many of the problems associated with the regulation of wildlife rehabilitation. In the definition section, the purpose of wildlife rehabilitation can be set forth and the possession of wildlife for rehabilitation distinguished from educational use and exhibits, commercial activity, and private enjoyment.
3. Qualifications of Wildlife Rehabilitators. This section should include, in both qualitative and quantitative terms, the age, knowledge, skill, experience and veterinary support required to rehabilitate wildlife within the state. Required evidence of qualification may range from written tests and apprenticeships to documentation of experience and proof of training, continuing education, and veterinary involvement.
4. Facility Guidelines. This section would provide guidelines with which wildlife rehabilitation facilities can be evaluated. Facilities should be appropriate to the species of wildlife receiving care at each stage in their recovery and rehabilitation. Facility guidelines have been created by the International Wildlife Rehabilitation Council and the National Wildlife Rehabilitation Association and published in "Minimum Standards for Wildlife Rehabilitation" available through both agencies.
5. Application Renewal and Reporting Standards. This section should explain how applicants apply for and renew permits or licenses, and report their activity to the state management agency. This would enable the agency to monitor activity undertaken within the regulatory framework and to evaluate the level of activity of each permit or license holder.

The regulations must above all be understandable and enforceable. It would be beneficial for the agency to develop and maintain communication and collaboration with the wildlife rehabilitation community as regulations are developed and implemented. Ambiguity should be avoided. Where qualitative judgments are necessary, they should be based on established and widely accepted guidelines for compliance. Regulation should also provide a framework that encourages compliance rather than simply punishing non-compliance. Permit applicants acting in good faith should be able to comply with the law without facing undue hardship. The end result will be a regulatory system which facilitates and enhances the temporary care of native wildlife and maximizes the chances these animals will have of returning to the wild and functioning normally within their ecosystem.

Big-Red, Thirteen Years and Counting

By Marjorie Gibson

Species and natural history

Red-tailed hawks (*Buteo jamaicensis*) are one of the best known and most widely distributed hawks in North America. They are one of the largest hawks found in the U.S., sharing the distinction with the Ferruginous hawk. Researchers have noted a decline in numbers of Red-tails, especially during the past 30 years. The decrease in population, while multifaceted, is thought to be due in part to encroaching human population and development of former habitat, both nesting and hunting (Bloom, 1999).

Red-tails appear to have a tolerance for most habitats and use a variety of prey species within their natural range. They are found in deserts, mountain areas and in the plains of the Midwest (Terres, 1995). This tolerance has extended to some pairs adapting to live in metropolitan areas. One famous pair of red-tails even calls New York's Central Park their home territory (although the female died last year following an intentional poisoning).

The Red-tail featured in the following success story is a bird that has adjusted to the habitat and prey limitations which exist in close proximity to a large city. Its home range is within populous Orange County in Southern California, the city of San Juan Capistrano.

How the bird was obtained

On November 12, 1986, Orange County Animal Control delivered an adult Red-tailed hawk to the raptor facility that I operated from 1978 to 1990, the Orange Country Bird of Prey Center in Villa Park, California.

A truck had hit the bird during a rainstorm in San Juan Capistrano. I will never forget my first sight of this magnificent bird as I opened the cardboard carrier. She was a sad sight, dripping wet and badly injured, yet when she looked up at me, she did not inspire pity. She had spunk and that indescribable "something special." I knew at that moment that we were both going to "give it our all" as we waited for the time when she was free once more.

Southern California experiences an increase in red-tail hawks during the migration period from September through March. Since the injury occurred in November and the bird was not banded when it was received, there was no way of knowing if the bird was a migrant or a resident of the area.

The bird was large by western U.S. standards (birds in Eastern U.S. are generally larger). Weighing in at 1700gms, it was identified as a probable female bird (Altman, et al, 1997; Terres, 1995).

The bird sustained a fractured ulna. The fracture was midshaft with the radius remaining intact. The fracture was not compound and the prognosis for the wing to heal completely was excellent. The condition however, was complicated with a head injury. The left eye was swollen shut. Blood dribbled from her nares and beak. She had a full crop upon intake, apparently having eaten a large meal just before the accident. The overextended crop may have contributed to the accident by making the bird less capable of clearing the vehicles in the roadway.

Problems in rehabilitation

My notes from the time are somewhat incomplete when addressing the bird's head injury and the length of recovery time. They are, more than those of any other bird, punctuated with frequent comments of how special this particular bird was and how much I wanted to see her free again.

The following are excerpts taken from my patient records during the bird's recovery.

Dec. 22, 1986
Red-tail # 8657
The wing has healed well; there is no droop. She is put into a larger flight, but the head injury just may make her non-releasable. She has a persistent nystagnus when she is stressed physically. Eyes normal to reaction and in appearance. Eating well, but only small pieces of meat or cut up mice. Will not tear on her own. Maintaining her weight, but not a heavy eater.

March 15, 1987
Red-tail #8657
There are no outward signs of head trauma at this time. The bird flies well but her landings are inconstant. She has begun to tear her own food. She has a presence that I cannot imagine keeping in captivity. I want this bird to go!

July 12, 1987
Red-tail #8657
Today is the first day that I am sure this bird is leaving here and going home. She has taken on a whole new attitude seemingly overnight. She vocalizes for the first time since her injury. She flew to her food shelf and began ripping at everything on it. She has taken an interest in the young red-tails for the first time. It was as though she has been in a fog since the accident and that has finally lifted. Tomorrow we begin in earnest training for release day!

August 27, 1987
Red-tail #8657
Release day. A big day for everyone. However, especially for this big red- tail. She was

magnificent as she flew into what may have been her former territory. Not a dry eye in the crowd as she circled overhead twice before she flew into the distance. Many uncertainties lie ahead for her. We wish her the best.

The encounter

In early spring of 1999, I received a call from a former research associate that still lives and works in Southern California. He had a band recovery for me to check against my records. Band recoveries are usually not good news as it means the bird has been in someone's hand, and given close enough scrutiny to read the tiny numbers of the USFWS metal band. Most times it means the bird is dead. This time, however, the news was not only good but great! The bird was trapped as part of the research effort to identify and transmitter birds on territory in the urban setting. One of the Red-tails I banded in 1987 was now a resident female of a territory that was part of an ongoing habitat and territory size study. I could hardly wait to dig through my banding records and uncover the mystery as to the bird's history. Since most of my banding was done during research on the wild population of raptors, not those in rehabilitation, I had no idea that this could be the same bird I knew so well in 1986 –1987.

I checked my records. I could hardly believe my eyes! The band belonged to "Big Red" also known as #8657. She had been released in San Juan Capistrano about a half mile from where she was injured on August 27, 1987. She was the resident female from the Del Obispo Territory. The nest tree was across the street and about 20 feet from the site of her accident that had nearly killed her some 13 years earlier.

She was an adult when she came into rehab in late 1986. That would put her age at two years old or over at that time. Given those parameters, in the spring of 1999 she was at least 15 years old and very possibly older.

Conclusion

In April of 1999, the red-tail nest tree was climbed and four youngsters age four (4) weeks of age were banded with USFWS bands. The tranmittered female and her mate flew overhead vocalizing at the bander. This time he knew who she was. He also knew that she had quite a history, including having spent nearly 10 months in a rehabilitation center as she recovered from a wing fracture and serious head trauma.

Despite all odds, she made it. Her band recovery was proof not only of the value of rehabilitation, but also the value of banding.

Comments

There is the continuous discussion on the question of whether wildlife rehabilitation is valuable work. I would suggest that at least for that particular red-tail hawk and the chicks she has brought forth during the past thirteen years, that it is.

Furthermore there is debate whether wildlife rehabilitation is successful especially for animals with serious injuries. This bird certainly proved that point in spades. Not only is she alive and well, but she is reproducing in marginal habitat.

I had the opportunity to visit "Big-Red" a few months ago. It was then that I knew that she had given me a gift as well. Her success was a shared success with me and with rehabilitators everywhere. She is what it is all about.

Long may she fly!

Author's Note: The orange grove surrounding the nest tree was cleared in July of 1999 to make room for a housing project. Biologists will be watching to see what this red-tails reaction will be in the next nesting season. Her nesting will be followed next year to see if a brood can be pulled off with marginal habitat further compromised.

References

Altman, R., et al. 1997 Avian Medicine and Surgery, pg. 1027, W.B. Saunders.

Bloom, P.H. 1999. Red-tail Habitat/Urban Dispersement, Unpublished.

Terres, John K. 1995. The Audubon Society Encyclopedia of North American Birds, pg. 484-485, Wings Books.

. . . . . .

Statistics show that every year tens of thousands of wild animals are admitted to rehabilitation centers in the U. S. alone. Many are released back into the wild, but what happens to them next? Most of the animals that we release are never encountered again. However, many rehabilitators have stories to tell of animals they meet again, after release. Each case is significant and interesting. They not only give us hope that the rehabilitation of wildlife can succeed, they offer us another way to evaluate our work. Up until now there has not been a place where wildlife rehabilitators could share individual stories with the rehabilitation community at large. This column was created to help fill that gap.

We invite you to participate by contributing your own rehabilitation "success stories." Send your stories to IWRC, 4437 Central Place, Suite B-4, Suisun, CA 94585-1633, or by e-mail to: iwrc@inreach.com.

STORY FORMAT:

1. Species & pertinent natural history information appropriate to the story.
2. How the animal was obtained, found, or captured.
3. Problems or concerns: circumstances, injuries, or illnesses.
4. How the animal was rehabilitated: specific techniques.
5. The release: where, why the site was chosen, and how the animal was released.
6. The encounter: how it was encountered after release.
7. Comments: significance of this animal's rehabilitation and this encounter.

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FROM LAST EDITION...
CASE VII:

Baby Season Blues

The last case featured in the Journal dealt with the decreasing number of volunteers in relation to ever-increasing caseloads. Concern over some of the problems caused by an overload of animals and a lack of good, qualified volunteers was discussed. The idea of setting limits on admissions was explored, while recognizing that the reality of this solution is often difficult.

What can be done to find and train new volunteers? What would be some ways to help reduce stress to the caregivers who are caring for these animals with fewer and fewer resources? These are some of the questions that were put forth to our readers.

RESPONSES

I.

Gail and Terry are tragic victims. They are compassionate, dedicated, skilled, experienced and hard-working to a fault. Yet, they are wasted. They are killing themselves in a futile cause.

With the demise of the Flying High Songbird Rescue, Gail and Terry's highly developed conscientiousness is causing them to carry a significant burden of guilt for the resulting loss of wildlife care; they are, in fact, self-victimized. To compensate, Gail and Terry are trying to fill the vacuum.

It would help them if they understood that the guilt is not theirs. The Rescue was operational for a long enough period to raise the community's expectations regarding wildlife care. Once this occurred, the Rescue created for itself – probably without realization—a moral obligation to the community. Now suddenly the Rescue is no longer in business, and the community is howling its consequent anger and frustration. Since Gail and Terry are alone and visible in their rear-guard action, the community naturally vents its spleen on them—adding to their guilt.

It would also help if Gail and Terry understood where the guilt for breaking the moral bond actually resides and why. It sits squarely on the shoulders of the Rescue's management and Board of Directors.

The Rescue probably started out as a typical "garage" operation. At some point in its growth, it apparently negotiated successfully the transition to a more formal organization with a staff and Board of Directors. However, as any organization grows, its ability to manage increasing customer demands, greater financial stress and a growing workforce must keep pace.

In the Rescue's case, this clearly did not happen. At their first floundering, the Board and staff should have focused on bringing in proven management to deal with the incipient problems. Any overload problem would have then been mitigated—if not solved completely—by knowing how to exploit synergies endemic to the organizational knowledge base, to design new processes to spread the load more efficiently and ensure all necessary back-up, and to plan effectively for the months ahead.

With growth properly managed, the specter of eventual overload will, in time, disappear completely because patient input will reach saturation. The local bird population will tend to stabilize, as will the probabilities of injury and sickness. The local human population will also stabilize, as will the percentage of those likely to make use of the Rescue's services.

But what of Gail and Terry's overload problems? First, they must exorcise their personal demons and come to terms with not having to owe the world a surrogate Rescue wildlife hospital. When not driven by this mania, they will be more likely to bite off only what they can chew. Second, they should stop advertising and reduce their visibility. This will temper the demand for their services. Third, any urge to expand must be limited by what they personally feel they can comfortably manage. If their management skills are minimal, then they should not even think about expanding without some kind of meaningfully supportive assistance.

Christopher Panton, Ph.D.
Danville, CA

RESPONSES

II.

Baby Season Blues expresses the complex situation in which all wildlife rehabilitators' function. There are big centers raising lots of money and working with many salaried employees and volunteers and one-person centers, specializing in one species of wildlife, sometimes for only a few busy months of the year. If, in any given area, there is a big center, surrounded by subpermits and small centers, within a few years it al seems to work out—some begin and grow, some fail, and some hold steady. How do we improve this situation? Well, I don't have an absolute answer, but I do have a suggestion.

Each state should move wildlife rehabilitation into an agency that really wants wildlife rehabilitation to work. This agency should hire one or two reasonably paid (plus expenses) staff members, agreed upon by the licensed rehabilitators, whose job it would be to make wildlife rehab work in that state. This is not an inspection person; this is not a cage counter; this is someone whose entire function is to make the system work. He or she would have a background and degree related to one of the many fields encompassing wildlife rehab—my feeling is if they know a part of the answer, they can read the research to find the solution in other areas (veterinary science, wildlife biology, animal nutrition, etc.).

What would they do? They would locate and become familiar with the different rehabbers in the state and determine if more are needed in some geographical areas or for certain spe-

cies such as baby birds. They could then set up educational opportunities in that area. Supplies, both donated and "for sale" could be found, and a system of ordering put in place. They could determine if some centers wanted to specialize in certain species and work out a phone system that would handle this. This phone system could route animals such as baby birds to the less crowded centers. They would be able to put together strategies for fundraising for the individual centers and statewide projects. At times, they would answer questions or know to whom to turn when a problem arises. Visiting and talking with people (they would have to be a people person as well), they would open up communication between centers and agencies, assist in getting started, and offer relief methods when an existing center is overwhelmed. They could put it all together so we function more easily. With just a little help, big centers and individuals can work together so there is less burnout or failure.

This does not need to be a huge agency—in fact, that would defeat the purpose. They need someone who knows the problems and doesn't pass the buck when faced with a question or problem. Larger states may need more than one person to oversee their rehabilitation system, but never more than 2 or 3 people.

Wildlife rehabilitators are probably some of the toughest and most independent people you can find. It takes toughness and independence to do rehab. But I think we could do a better job if someone was helping us, both big and little centers, put it all together everyday. The wildlife in our care would certainly benefit from the freedom it would give us. The freedom I'm talking about is the freedom to know that we had someone behind us and we didn't have to do it ALL. It's baby season—gotta run...

Lois Sakolsky
The Flying Mammal Wildlife Rehab
Pittsburgh, PA

RESPONSES

III.

Basically, there are no solutions to the problems of too much work, not enough staff, money or hours in the day.

We are a backyard rehab center in a huge urban area. With a sparse handful of volunteers, we took in 3000 birds a year, 2000 of them natives, the rest pigeons, starlings, etc. We discovered early on that the public coming to the house was a real nightmare, and our local animal shelters volunteered to take in the birds, regardless of the jurisdiction, so long as they were brought in by the public. This worked like a dream. We had six animal shelters working with us. The vet techs would triage the birds for us, so basically we got really good healthy or fixable birds. We had training programs with the shelters and we had community support. We had this relationship for six years. The downside was the public thought the shelters funded us so our donations were very small. Also, the populations we serviced simply did not have extra anything. At that time we considered ourselves a community resource—we were doing good for nature, we were educating as much as we could and making a difference in a small way.

Then we got a new neighbor who did not like my dogs. We had the dogs as pets, but also to keep curious people out of the yard so the birds were safe during their outside time in flight cages. He found a way to work the city and county system and, with the help of a City Council person, to "revisit" the laws on the books and force us to relocate. He realized he couldn't "get us" with the dogs, but he certainly could with the native wild birds. To make a long story short, we moved, found a large property that could fulfill every new and old distance requirement, but are still struggling with the city to grant us a conditional use permit to use our land for rehab of birds that come from here.

Every agency has targeted us and the struggle continues. All but one of the animal shelters made it so difficult for us, we no longer service them. We now see rehab as something we want to do—not as a community service, not as anything lovely and idealistic. The work is hard, the hours long and we are very good at what we do. We will never be respected by those outside of rehab and our work will always be viewed with suspicion.

While we love what we do, we are seeing the personal cost as too much. All of our spare time is spent doing more paperwork for the bureaucracy so we have no time to fund raise. The few rehabbers that exist in the county are so busy with their own rehab efforts that trying to absorb any of our difficulties is impossible. The idea that this could happen to them is something no one wants to consider. So, our days are numbered. We will go forward with the paperwork to secure the conditional use permit, realizing that any remote complaint will be taken seriously, without fact or investigation. We will do the best job we can on every individual, paying for nearly everything out of our own pockets. I hate the idea that rehab will come to this for others. The human/wildlife interface will be so difficult that the caretakers of the most vulnerable will be forced to flee or quit just to save themselves.

And is there life after rehab? I guess I'll let you all know.

Diane Waters, President
Wild Bird Rescue, Los Angeles, CA

JOIN THE CONVERSATION

On the following page, the *Journal* presents a new case to consider. We invite you to read the 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, send your response by October 30, 1999, to IWRC, 4437 Central Place, B-4, Suisun, CA 94585-1633 (marked "ATTN: Up for Discussion"), or via e-mail to iwrc@inreach.com.

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

CASE VIII:

Feeling Bulldozed

Karen, a licensed wildlife rehabilitator for mammals, was frustrated. She needed some advice and support from someone that understood local politics and would not be emotionally involved, so she called Theresa, a rehabilitator in another state whom she had talked with on a variety of rehabilitation topics.

A local construction crew had inadvertently bulldozed a fox den. They found two dead juvenile foxes and one that seemed generally okay but was stumbling around, somewhat dazed. There had been no sign of an adult fox. One of the crew took the fox to the nearest vet's office. The receptionist accepted it from him and said Dr. Powell would take care of it, as he did other animals in need.

The crew member's wife, Marie, saw Karen at the grocery store. Marie, knowing that Karen was a rehabilitator, told her about her husband taking the juvenile fox to Dr. Powell.

Karen knew she was the only rehabilitator in the area licensed to take in fox. Since she had not been contacted by Dr. Powell's office, she called and asked about the status of the fox. Dr. Powell told her that she didn't need to worry. The fox was doing just fine in his dog kennel, and besides, the staff were really enjoying playing with the little fellow. Karen explained the state wildlife regulations requiring that wildlife be turned over to licensed wildlife rehabilitators for rehabilitation, except for emergency care of less than 24 hours. Dr. Powell said that might be, but that he was keeping the fox. He saw no reason to give it up to a rehabilitator since he was a licensed veterinarian.

Karen explained that wild animals needed specialized care, and that wildlife is the property of the state and governed by state law. Even veterinarians were required to have a rehabilitation license or surrender the animal to a licensed wildlife rehabilitator.

Dr. Powell scoffed at her and said that he understood animals and that she was not getting the fox. He said that his kennel technician had found information on fox diet on the Internet. They thought that the diet on the "fox help" website was a bit expensive though and had substituted cow's milk and dog food; the fox really seemed to like it and it was much better than providing road kill or live mice.

While Dr. Powell personally didn't like having wildlife around because it was so messy, the staff was enjoying it. He was not turning the fox over to Karen or any other rehabilitator. Period!

Karen called and left an urgent message for her local wildlife officer. It took two days for him to call her back. She explained the fox situation, mentioning the handling, Internet data, bad diet, the fact that foxes are rabies vector species, and the probable future problems of releasing a fox habituated to humans, if it lived. The officer said he and his boss both knew Dr. Powell (they hunted geese together and Dr. Powell treated their hunting dogs); they thought he was a great fellow. If Dr. Powell wanted to keep the fox, he felt it was his choice. When Karen reminded him of the rehabilitation regulations, the officer said he was allowed some discretion, which she should remember. Besides if Dr. Powell's office had gone as far as looking up diets on the Internet, it showed they cared and would do a good job raising it. He told Karen it was not her responsibility.

Karen just didn't know what to do. Dr. Powell had already held the fox for nine days. Karen was concerned about the care the fox was getting and worried that he might not survive. If the fox did survive, he would likely become a nuisance animal and cause a variety of problems, some of which might be blamed on "bad rehabilitation." Also, if he was habituated to humans he might approach them and that would be a problem. Plus, there was the chance that the fox could transmit diseases or parasites to humans or pets kept in Dr. Powell's clinic.

Theresa suggested that Karen would have to go up the hierarchy in the wildlife agency and ask for action. That worried Karen though, since Dr. Powell apparently had friends in the agency and she didn't want to make an enemy of him. Besides, she didn't want to be at odds with her wildlife officer since he inspected her facility and influenced whether she kept her license (he still didn't like wildlife rehabilitation no matter what she had tried). Karen's region wasn't large enough to have many veterinarians on whom she could call for help, especially if a popular one like Dr. Powell was saying things against her. Karen would make a decision in the morning.

POSSIBLE QUESTIONS FOR DISCUSSION

1. Rehabilitating wildlife is different from caring for domestic animals. However, many people experienced with domestic animals do not know the differences or understand the consequences of their actions when applying the same techniques used for domestic animals to caring for wildlife. What can be done about this?

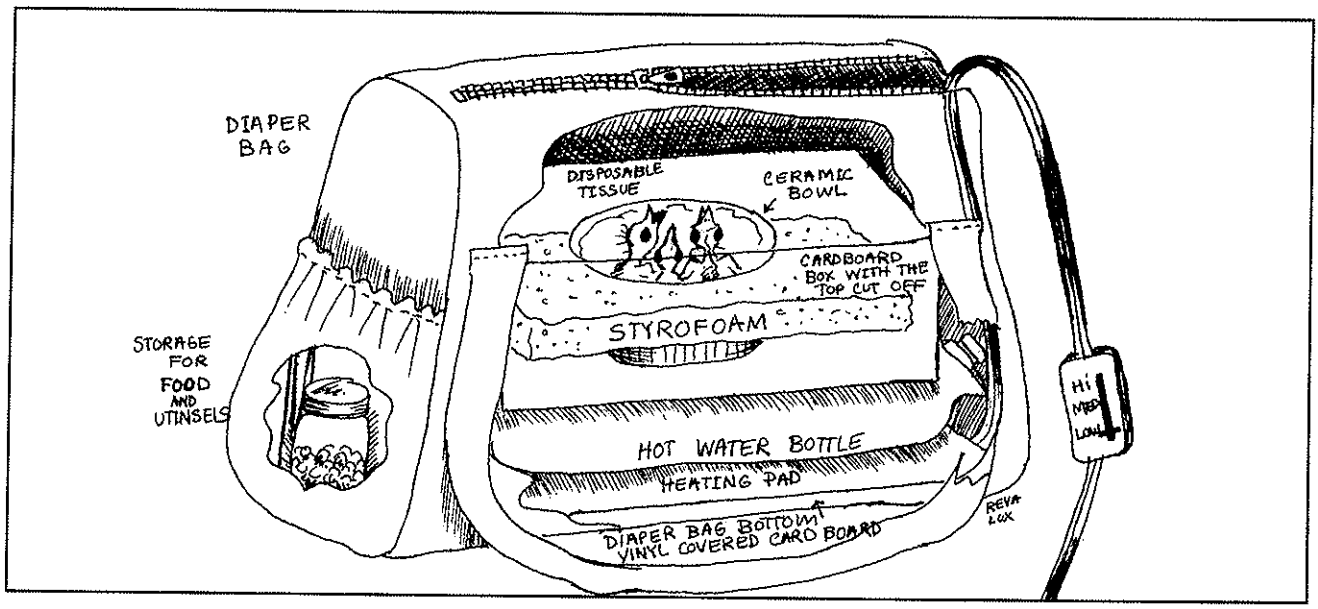
2. What can a person do when the state wildlife agency does not enforce wildlife regulations? What are some of the risks of taking action?

3. There are many sources of information on the Internet giving suggestions on wildlife care. Some of the information is good; much is not. What can rehabilitators do about the proliferation of Internet information that may do harm to animals or humans?

SIMPLE SOLUTIONS

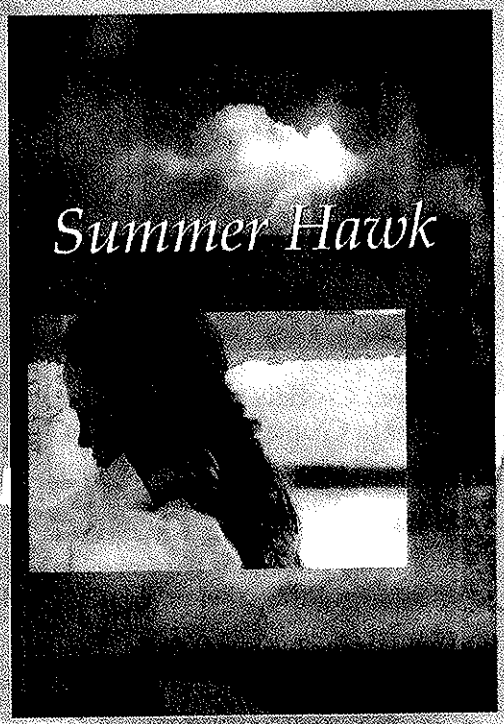
Nestling or Small Mammal Carrier

By Reva Lux
Licensed Wildlife Rehabilitator
2229 Breyman St., NE
Salem, OR 97301, USA



It is said that necessity is the mother of invention and now it's clear why! For an active rehabber with a family, two of the hardest things to provide the youngest rehab charges are frequent feedings and constant warmth. Out of desperation this idea arose. I am sure I am not the first to think of it but perhaps the first to write it down. What was something that would keep nestlings warm while traveling with the caregiver for more than an hour at a time, as well as something to store food and bedding in? After quite a few baby showers at our church, the idea of a diaper bag for a different kind of baby was born. A clean, used diaper bag was purchased at the local thrift store. The next question was how to keep it warm for long periods of time? The idea of a waterbed came to mind. When using heating pads, the heat dissipates quickly once the pad is unplugged. But, if the heating pad is placed under a water bottle, it keeps the temperature stable for about an hour and a half. The zipper becomes the climate control button. When the nestlings' heads are stretched out and their mouths are open, they are too warm, so the zipper should be opened a little more. If they are all scrunched down and huddling together, close the zipper a little more to retain warmth. A piece of Styrofoam will hold their bowl in place. Use a ceramic bowl preferably since it conducts the heat evenly. The babies will stay quiet and warm and travel right along until they are older and can go longer between feedings. This can also be used as an opportunity to educate people. When asked questions about the bag and its contents, information about wildlife rehabilitation and the need for state and federal permits to care for these birds can be given. Never allow people to touch or handle the babies. The period of time that the babies will travel with the caregiver and need the frequent feedings usually lasts about two weeks. After that time, the birds can be left at home with less and less human contact. The limited contact that they have during this intensive care period should not create a problem, and the educational value cannot be over-estimated. The whole set-up is comparable to an incubator with very gentle, constant warmth, and it should prove successful with even the tiniest of babies.

Summer Hawk by DEBORAH SAVAGE



0-395-91163-X Age 12 and up $16.00

A compelling tale well told

Novelist Deborah Savage skillfully tells the story of a young girl who discovers her voice and the nature of love through the care she gives to an abandoned red-tailed hawk.

★ "The author uses raptors, and especially the red-tail, as metaphors for the heart's yearning to be free and strong, and to be a survivor, as Taylor and her hawk both are. Savage skillfully addresses the myriad themes and issues that weave through this novel — conservationists vs. hunters, dual-career families, ambition, fidelity, the importance of family, a budding first romance, and mental illness. Fast paced yet thoughtful, the book is satisfying on all accounts." — *School Library Journal*, starred reivew

Available at your local bookstore.

HOUGHTON MIFFLIN COMPANY
BOSTON, MA

BOOK REVIEWS

Summer Hawk

By Deborah Savage

The plot of this novel figures around a raptor rehabilitation facility. It is obvious the author has had intimate exposure to wildlife rehabilitation, rehabilitators, and appreciates the complexities of returning injured birds to the wild state.

From the first introduction of one of the main characters, rehabbers will chuckle at the description of "the hawk lady." Her perceived strong and stony exterior is effective at hiding a warm and gentle individual that suffers misunderstanding by the public. That description alone will cause many in the raptor community to look over their shoulders for hidden cameras.

As the character evolves, your mind will busy itself wondering which raptor rehabilitation center director served as a template. By novel's end you may well have revisited everyone involved with raptors that you have ever known, reviewing each of their lives for comparisons. That aspect will be lost on the general reading public but serves to make great entertainment, beyond the novel itself, for those of us in the field.

The author has done her homework. The text is peppered with raptor facts throughout the story. Some of the techniques, such as use of intramedulary metal pins, may date the story, however.

This novel is an entertaining easy read. It offers a mix of mystery, adventure, romance, and even the real life ubiquitous presence of politics in wildlife rehabilitation and the stress it creates is accurate.

A delightful mix of fiction and facts, this book will stir the rehabber in you if nothing else.

—reviewed by Marge Gibson

Fiction Novel, Houghton Mifflin Co., Boston, MA, 1999
298 pages, $16.00 U.S.

Biomedical and Surgical Aspects of Captive Reptile Husbandry, 2nd Ed. (2 Vols.)

By Fredric L. Frye

This over-size book is regarded by many as the definitive text on the subjects of the medicine, diseases and surgery of reptiles. It has been highly praised by such periodicals as the Journal of Small Exotic Animal Medicine and the Journal of Zoo and Wildlife Medicine. Frederic Frye is considered one of the founding fathers of reptile medicine and these two volumes represent a compendium of most of a lifetime's anecdotal clinical work as well as classical research. This book, in one or more of its editions, is probably the most cited reference on reptile medicine in use today. The book's approach is focused on captive reptiles and the

medical aspects of maintaining them in a healthy fashion. As a result, it covers a substantial amount of information useful to professional keepers, advanced hobbyists and rehabbers as well. Since many wild reptile injuries and diseases require substantial time to completely heal, even under the best of care, this text can be invaluable in terms of providing methods for monitoring ill animals, providing an appropriate habitat during recovery and insuring that nutritional requirements are met while under care.

The text is comprehensive, covering the basics of captive husbandry, feeding, reproduction, diagnostics, medical conditions related to captivity, radiology, parasitology, anesthesia, developmental abnormalities, surgery, histology, disease processes, euthanasia and necropsy, as well as antibiotic therapies.

One aspect of the text that makes it truly invaluable is the huge variety of photographs illustrating virtually every chapter's contents. Radiographs and MRI studies show both normal and abnormal conditions. Color photos illustrating symptoms of illnesses and developmental abnormalities, etc. are tremendously useful in differential diagnoses. Photos, drawings and other illustrations are used to show surgical procedures more clearly. Photomicrographs are used liberally to reveal the details of clinical diagnostics.

The book is also rich in tabular information covering such diverse topics as nutritional requirements, drugs and their uses, histochemistry, plasma electrolytes, erythrocyte data, toxic plant lists, and food preferences by species.

Accompanying this wealth of data is the text, which is direct, clear and well-written, though not intended for a lay reader. It assumes a background in veterinary medicine. This can be somewhat overwhelming at times, and I have found the presence of a good dictionary useful (such as Saunder's Veterinary) in treading some of the deeper waters.

Not all the information is useful to the rehabber. Some requires far more knowledge than we, as a rule, possess. However, it has become a cornerstone book on my shelf for both triage (the wonderful illustrations) and reference.

This could also be a wonderful gift book for your veterinarian. Little, if any, of the information would be wasted in their hands. It has proven particularly useful to my vets for parasite review, necropsy and blood work. They also refer to it for less common surgical procedures as well. All in all, I feel it is one of a handful of books that represent the core of a library for the serious reptile rehabber.

—reviewed by Franklin Gould

Krieger Publishing Company,1991
PO Box 9542
Melbourne, FL 32902
712 pages, $175.00 U.S.

Parasitology for Veterinarians, 7th Edition

By Dwight D. Bowman, MS, Ph.D. and Randy Carl Lynn, MS, DVM

Georgiís Parasitology For Veterinarians (7th Edition) by Dwight D. Bowman MS, Ph.D. and Randy Carl Lynn MS, DVM is a very complete book regarding the taxonomy and clinical identification of animal parasites. The book has a very extensive text describing the taxonomy, gross identification, microscopic identification, treatment options and histopathology. The book is written for veterinarians so the reader is expected to have a working knowledge of normal taxonomic charts and nomenclature.

Chapters 1-3 are devoted to identification. They are great references for taxonomy. Life cycles are detailed and many identification and treatment modalities are discussed. A more complete discussion on diagnostics and treatments follows in Chapters 4 and 5.

Chapter 4 discusses Antiparasitic Drugs. There is some discrepancy between Coccidia treatments mentioned in Chapter 2 and Chapter 4. A veterinarian specifically addressing treatment modalities writes chapter 4, whereas Chapter 2 mentions treatments more as a discussion in reference to the life cycle of the parasite.

Chapter 5 addresses diagnostic procedures and is quite extensive and complete. There is a great description of diagnostic techniques including necropsy and examination of organs for parasites.

This book moves easily from index to species of animal in which a specific parasite is found. From there an accurate guide/list of most likely parasites can be ascertained without having to laboriously key out the organism. Further identification can be attained using the first three chapters.

I was taught using the 3rd Edition of Georgiís Parasitology for Veterinarians. The 7th Edition seems easier to use as a reference and guide although the taxonomy is and always will be a less than exciting subject for most clinically oriented professionals. The illustrations and photos are great and lend tremendously to the high quality of the text. This book, although probably not for everyday use in a hospital, is a very complete and inexpensive reference. It should be a part of every hospital's library.

—Reviewed by Scott H. Weldy, BS, DVM

W.B. Saunders Company, 1999
426 pages, 616 illustrations
$55.00 U.S.

Self-Assessment Color Review of Avian Medicine

By Robert B. Altman and Neil A. Forbes

This book approaches avian medicine from a perspective different from any other reference book in your library. Using color photos to illustrate a condition or disease process in the avian patient, three or four possible diagnoses are raised for consideration using a question and answer format. The correct diagnosis is then given as a concise, easy to understand discussion on the following page. The authors appear to have made an effort to keep the language as simple as possible while not sacrificing detail and accuracy. The format reminds one of a study guide but a study guide with a difference. The product is a "seminar on the shelf."

A small book in terms of size, this reference would be easy to overlook. The more you read it however, the more you realize that the method of presentation encourages thorough evaluation of a problem. While this procedure is instinctive for most practitioners, a shortage of time and exhaustion can curtail the process more often than any of us would like to admit. This presentation style more often than not sent me scurrying to one of those fifteen pound reference texts for further investigation. Not so much because I was not aware of the condition, but because the questions entice one into the diagnostic process.

The color photos are a rich tool that enhances an understanding of the diseases discussed. Without them, or if presented in black and white, detail may be sacrificed, and with it realistic imagery.

Some of the conditions presented are those seen only occasionally in a career; others will be common in avian practice. I appreciated the fact that wildlife was included in the sampling of cases as well as "companion" birds.

While the book was written as a veterinarian text, the format lends itself to reference use for wildlife rehabilitators and other wildlife professionals that work with avian species. It is not meant, and should not be used, as a replacement for your veterinarian. It will be invaluable to veterinarians that do not have an extensive avian background.

Self-Assessment Color Review of Avian Medicine is an affordable book that parallels taking a seminar from some of the world leaders in avian medicine. What more can you ask for?

—reviewed by Marge Gibson

Iowa State University Press, 1998
186 pages.

Who Hops

By Katie Davis

This colorful and energetic book is written for the very young. It encourages beginning interest in animals through the means of locomotion. While not advertised as such, this book could easily be used for interactive movement games and is adaptable for a single child or a group.

Very simple words in enlarged simple print stand out against brightly colored backgrounds. This accentuates the printed word as well as the animal and the activity.

The book covers several varieties of animals and maintains children's attention by asking questions and changing the creature's mode of movement.

"Birds fly. Bats fly"
"Rhinos fly! "NO THEY DON"T"
"Rhinos eat grass and take lots of baths, but they DON'T FLY!"

The colors and renditions or the animals are brightly and imaginatively portrayed, sometimes free-formed but always free-spirited. You will not find brown kangaroos or gray whales within the confines of these pages. That may be seen as a negative to some educators that see wildlife education as too serious an issue to combine with fantasy.

All in all a fun book that will stimulate little ones to incorporate animals as part of their play and eventually as part of their daily lives.

—reviewed by Marge Gibson

Harcourt Brace & Company, 1998
Ages: Preschool and K, $13.00 U.S.

Home At Last A Song of Migration

By April Pulley Sayre
Illustrated by Alix Berenzy

This enchanting children's book introduces the miracle of animal migration to ages 3-8.

The simple text weaves poetry, a sense of beauty, and wonder into one of the most mysterious animal behaviors. Several animals are described, spanning the species from warbler to gray whale to lobster. Each is treated to its own brief but meaningful verse.

> "An Arctic tern hovers, then dives for fish. He has two homes: one at each end of the earth. He'll need lots of food to fuel his twelve thousand-mile trip. But it's worth it to be home at last."

The illustrations augment the tone of this beautiful and useful book. Soft colors fold around the animals blending them into the habitat. The resulting sense of mystery captures reading adults and listening children alike. Older children will love reading it on their own.

The final offering is a brief factual biography of each species addressed. This will be especially helpful to the older child seeking more knowledge.

—reviewed by Marge Gibson

Henry Holt and Company
New York, 1998, Ages 3-8

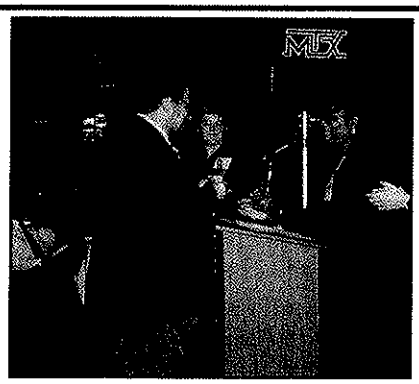
IN MEMORIAM

The IWRC and the field of wildlife rehabilitation has lost a good friend and longtime supporter with the passing of Guy Hodge.

Guy was the Director of Data and Information Services for The Humane Society of the United States, and was a pioneer in the development of techniques for the capture of oil-contaminated wildlife.

His was a familiar face at the IWRC's annual conferences and he presented many papers and workshops over the years for us.

An avid birder, he often led birding field trips for us at these meetings, generously sharing his extensive knowledge and expertise on many species of birds and other wildlife.



Guy is pictured above receiving the IWRC Tern Award, October 1996 in Niagara Falls, NY. This award is presented to someone who has "gone the distance" for wildlife rehabilitation.

He will be missed by those who knew and loved him and by all of the creatures that he served so well during his lifetime.

Fly high, Guy!

BOARD NOMINATIONS

The Nomination Committee is now accepting applications for positions on the IWRC Board of Directors. Nominations will be accepted from voting members of the organization. Term of office is three years. Deadline is 10/30/99.

There are three terms expiring in February of 2000. Nominees can request an application from the central office at: IWRC, 4437 Central Place, Suite B-4, Suisun City, CA 94585, or call 707-864-1761.

Board members are volunteers, representing the membership and are expected to actively participate in the management of the organization and its programs.

Election ballots will be mailed to all current members in November 1999.

NEWS BRIEFS

The New York State Wildlife Rehabilitation Council is holding its 19th annual seminar, November 19-21, 1999 in Ithaca, New York. The seminar is being co-hosted with the Wildlife Health Dept. at the NY State College of Veterinary Medicine, Cornell University. Specialty sessions include: full day oiled wildlife emergency response; animal basic course; rabies vector species training; full day veterinary session; cage building and lots more. For more information contact Julie Harjung, PO Box 272, Parksville, NY 12768, 914-439-4733, <rangerncats1@juno.com>.

The Wildlife Center of Virginia presents its 4th annual wildlife rehabilitation conference, "Call of the Wild," November 20-21, 1999, at the Massanetta Springs Conference Ctr., Harrisonburg, Virginia. Topics include: raptor rehabilitation; skunk rehabilitation; rearing songbirds; care of injured adult squirrels; parasitology; avian and mammal anatomy and much more. For more information contact The Wildlife Ctr. of VA, Rehab Conference Coordinator, PO Box 1557, Waynesboro, VA 22980-1414, Phone 540-942-9453, email: <vet@wildlifecenter.org>, or check web site at: www.wildlifecenter.org.

Other meetings of interest: **Midwest Sociological Assoc.**, Chicago, IL, April 19-23, 2000. Contact Theresa Goedeke at 573-882-5752, or check web site at www.drake.edu/MSS/annual/papers2000.html.

World Assoc. of Wildlife Vets: Sept. 23-26, 1999, joint meeting with European Section of **WL Disease Assoc.** and **European Assoc. of Zoo & WL Vets**, Lyons, France. WAWV is also holding a joint meeting with the Australian Assoc. of Vet Conservation Biologists and the Australian section of the WL Disease Assoc. in Australia, April 2001. For more info on meetings or about the World Assoc. of Wildlife Veterinarians, check their new web site address at: www.uniud.it/DSPA/wildvet/wawv/wawv.htm.

CAREER CORNER

The International Crane Foundation invites applications for the position of **Staff Veterinarian.** Candidates must have a veterinary degree and at least two years of experience in zoo, wildlife, or avian flock medicine. Responsibilities include health care for the captive flock of 120 cranes, veterinary assistance to ICF's global crane conservation projects and the development and implementation of appropriate research projects. Contact Claire Mirande, Director of Conservation Services at 608-356-9462 x 122 for additional details and information or email her at <mirande@savingcranes.org>.

PAWS Wildlife Rehabilitation Center is seeking an **Operations Manager.** This person would be responsible for the construction and maintenance of facilities, investigating release sites and conducting post-release research. Must have a college degree, preferably an advanced degree in wildlife biology. Must have computer skills, including setting up databases and analyzing release data. Rehabilitation background, carpentry skills & radio tracking experience preferred. Salary DOE. To apply send a resume and cover letter to Deb Dyson, PAWS, PO Box 1037, Lynnwood, WA 98046.
Phone: 425-787-2500 x 816.

GUIDELINES FOR AUTHORS

THE JOURNAL OF WILDLIFE REHABILITATION invites submissions in several categories, including feature articles, case studies, brief pieces sharing practical tips, and book reviews. The *Journal* publishes articles on natural history, rehabilitation, wildlife policy issues, and other relevant topics. Articles on veterinary medicine as it relates to wildlife rehabilitation are also welcome. To expand the international scope of the publication, individuals from countries outside the United States are especially encouraged to contribute.

All submissions to the *Journal* will be evaluated by the editors and anonymous reviewers with expertise in the relevant subject matter. The editors will consider clarity, conciseness, accuracy, and overall thoroughness when determining if the work is appropriate for publication. Authors should strive to present their work succinctly and with minimal jargon. Normally, work submitted for review should not exceed 5,000 words.

All authors receive a $30 honorarium for each article published or a one-year individual membership or renewal. IWRC retains copyright on all articles published in the *Journal*, but will usually grant permission to reprint articles upon request, with credit given to IWRC.

SUBMISSION INSTRUCTIONS

1. To submit an article to the *Journal*, send four copies of the manuscript to *Journal* Editor, IWRC, 4437 Central Place, Suite B-4, Suisun, California 94585-1633, USA. Manuscripts should be typewritten and double-spaced. Include the author's name, address, phone number, and electronic address, an abstract, several key words, references, and a one-paragraph biography of each author. If trade names are used, indicate if product is trademarked or registered, and list any products cited, along with generic equivalents, at the end of the article.
2. If possible, also send an electronic version of your submission. Whether sent by regular mail to IWRC on diskette or sent via electronic mail, please make sure that your electronic submission can be converted to a Macintosh format. To help facilitate this process, include the name of the software and operating system used to prepare your submission.
3. If the submission has been published elsewhere, the author is obligated to obtain permission or reprint rights before submitting the article to the *Journal*.
4. Citations should be noted within the body of the article with the last name of the author and the year published, and full references should be included at the end of the manuscript in alphabetical order beginning with the author's last name.
5. The *Journal* publishes high-quality black and white photographs as available. Color slides and prints are acceptable as well, though all images will appear in black and white format only. Please include photo credits.

FOR INFORMATION

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