



Home Study Guide
for the
Ontario Wildlife
Rehabilitation Exam

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INTRODUCTION TO THE STUDY MATERIALS

You have received the following documents because you have expressed an interest in acquiring a Wildlife Custodian Authorization to rehabilitate native wildlife in the Province of Ontario. These documents include the:

- 1) Home Study Guide for the Ontario Wildlife Rehabilitation Exam
- 2) Exam Booklet for the Ontario Wildlife Rehabilitation Exam
- 3) IWRC/NWRA Minimum Standards for Wildlife Rehabilitation
- 4) Wildlife Rehabilitation Policy and Procedures and Standard Wildlife Custodian Authorization Conditions

The information in these documents will assist you in understanding what wildlife rehabilitation entails and will help you decide whether or not you want to become involved in this activity. It is important to remember that the information in the study materials are just an introduction to wildlife rehabilitation. Understanding the basic concepts will help you acquire your authorization, but you will need to learn more -- by reading more detailed materials, taking courses, going to conferences, and networking with wildlife custodians. Wildlife custodians continue developing their skills, no matter what their level of expertise. Provincial, national and international rehabilitation organizations (see Appendix One) publish newsletters and journals, offer training courses, and sponsor conferences; joining one of these organizations is one way for wildlife custodians to stay up to date on wildlife rehabilitation information and techniques.

Preparing for the Ontario Wildlife Rehabilitation Examination (OWRE)

The examination to receive a Wildlife Custodian Authorization in Ontario consists of 100 written questions that have been chosen randomly from the nearly 500 questions presented in the Exam Booklet. You must achieve a score of eighty percent (80%) or higher to pass this examination. We have tried to make examination questions as clear and unambiguous as possible, and each exam question has only one correct answer.

The examination contains a great deal of information and you will need to do quite a bit of advance preparation. Study in detail the Home Study Guide and Examination booklets, and familiarize yourself with the information in the Minimum Standards for Wildlife Rehabilitation, jointly issued by the International Wildlife Rehabilitation Council (IWRC) and the National Wildlife Rehabilitators Association (NWRA). It will help if you have access to the NWRA Principles of Wildlife Rehabilitation binder and one or more common field guides as additional reference material. Additional reference material is listed in Appendix Two. By reading the questions in the Exam Booklet and conducting research to find the answers, you will learn a great deal of information about the biology of wild animals and wildlife rehabilitation

Remember that written materials represent just one learning tool. It is equally important that prospective wildlife custodians spend time working with, and learning from, authorized wildlife custodians.

Your local MNR office can assist you in finding a wildlife custodian in your area. Ask questions about the wildlife custodian's facilities, look at the kinds of reference books they have, find out how they located veterinarians and to whom they turn when questions arise. You may want to work with an existing wildlife custodian. The hands-on experience will help you decide if you want to dedicate the time and effort to be a wildlife custodian. If possible, attend a conference for

wildlife custodians. Become a member of a rehabilitation organization, such as the Ontario Wildlife Rehabilitation and Education Network (OWREN), the NWRA or the IWRC, and read their publications (see Appendix One for contact information). OWREN sponsors introductory courses in basic wildlife rehabilitation; attending one of them is a good way to prepare to become a wildlife custodian.

Should you have any questions regarding the materials you have been provided, please talk with your local MNR office or send your comments in writing to the Wildlife in Captivity Specialist, Ministry of Natural Resources, P.O. Box 7000, 5th Floor, North Tower, Peterborough, Ontario, K9J 8M5

INTRODUCTION TO WILDLIFE REHABILITATION: DEFINITION, PURPOSE AND PHILOSOPHY

Definition of Wildlife Rehabilitation

Wildlife rehabilitation in Ontario is defined as “the keeping of injured, sick or immature wildlife in captivity on a temporary basis to restore or effectively condition the wildlife so it can be successfully returned to the wild and may include medical treatment”. For rehabilitation to be deemed successful, released wildlife must be able to function successfully as wild animals. This functionality includes being able to recognize and obtain the appropriate foods, select mates of their own species and reproduce, and show the appropriate fear of potential dangers (including people, cars, cats, dogs, etc.).

The Ministry of Natural Resources and Wildlife Rehabilitation

MNR is charged with maintaining healthy wildlife populations and with preserving the natural habitats those animals need to survive. The ministry is also concerned with any diseases that wildlife might spread to people. A wildlife custodian must understand and balance the concerns of these and other agencies with concerns for the individual wildlife in their care.

Wildlife rehabilitation is regulated under the *Fish and Wildlife Conservation Act, 1997* (FWCA). Appendix Three outlines the section of the FWCA that specifically pertains to wildlife rehabilitation and provides a link to Ontario’s legislative web site. Wildlife rehabilitation is legislated to establish a framework whereby the goals as outlined in the ministry’s policy document may be achieved.

Rehabilitation of Migratory Birds

Permits issued by the Canadian Wildlife Service, Environment Canada are required to rehabilitate and care for migratory birds. Migratory birds are defined as all species listed in the Migratory Birds Convention Act (MBCA), which includes migratory game birds, migratory insectivorous birds, and other migratory nongame birds. Contact the Canadian Wildlife Service, Ontario Region office in Burlington for more information (see Appendix Two).

The Wildlife Custodian's Role

A wildlife custodian plays a multi-faceted role within the wildlife professional community. Those facets include:

Providing Rehabilitation and Care for Wildlife

Wildlife custodians provide places for the public to bring wildlife in need of medical and rehabilitative care. Wildlife custodians work with veterinarians, public-health officials, wildlife biologists, law enforcement agents, humane societies, and wildlife control agents to avoid or alleviate issues that may occur when people and wildlife come into conflict.

Educating the Public

As a wildlife custodian, one of your most important roles is as an "Ambassador of Wildlife." In many cases, you will be the first contact the public has with the professional wildlife community. What you say to the public, both on the phone and in person, may be crucial to the way a person views wild animals and conservation issues. Take the opportunity to educate the public about wildlife biology, management and rehabilitation to the extent that you are able.

Recognizing Endangered and Threatened Species

A current listing of birds, mammals, and reptiles considered endangered or threatened in the Province of Ontario can be found at the Species At Risk in Ontario (SARO) website listed in Appendix Three. You should learn to recognize SARO as species that require special attention. Should you receive a member of one of these species, your authorization requires that you notify your local MNR district office within one working day. Information you provide to the district office will feed into SARO research and recovery programs.

Recognizing Zoonotic Disease

A zoonotic disease is a disease transmissible from any other animal species to people. Such diseases can be caused by bacteria, viruses, parasites, or any other agent. A few examples would be rabies, tularemia, and the *Baylisascaris* parasite of raccoons. Wildlife custodians can play an important role in protecting public health by being alert to these diseases. Remember that the potential for zoonoses is everywhere, and when handling any wild animal you should be alert to that possibility. The rabbit you're handling could have tularemia, the orphan raccoon could be carrying rabies, or a tick carrying Lyme disease might crawl onto you.

What can you do? First, new arrivals in your facility should be quarantined; they should be in caging physically separated from your longer-term cases. Make sure that bedding, food, water bowls, and also your hands, shoes and clothes do not carry contamination from sick animals to healthy ones. One helpful hint is to treat sick (or potentially sick) animals last. That way, you are less likely to carry diseases to your healthy patients.

In preventing disease transmission (either among animals or to you), remember to practice good hygiene. Don't allow yourself to be bitten by your patients, especially if they are mammals. Use disinfectants properly and regularly on cages, food dishes, bedding, etc. If you can't disinfect it, throw it away! Wear disposable gloves. Don't launder your rehab clothes or animal bedding with your family clothes, especially if you have children or anyone on immunosuppressive medication in the house. If possible, get a separate washing machine for your rehabilitation materials. Never go barefoot into animal areas.

Another important step is to let your family physician know what you're doing. Not only will your doctor make sure you are current on your tetanus shots, but he/she may know of specific zoonoses in your area. Should rehabilitators be vaccinated against rabies? The human rabies vaccine is reasonably safe (although some people do have adverse reactions and side-effects) but fairly

expensive. If you plan to handle wild mammals regularly, the pre-exposure vaccination may be worth the expense to you.

Recognizing Epizootic Disease

An epizootic disease is the nonhuman version of an epidemic; it is a disease that affects many animals of the same (or related) species at one time. Wild species transport a variety of diseases that might cause significant mortality in domestic pets or food animals. One good example is canine distemper, an incurable disease that may cause large-scale mortality in dogs, raccoons and other susceptible species, but causes no problems for cats, birds, or people. Distemper is characterized by convulsive movements of the head, and discharge from the nose and eyes, disorientation, and lack of fear.

West Nile Virus is often fatal in birds, but most infected mammals do not become seriously ill. The presence of epizootic diseases in wildlife is another reason to practice good sanitation and to quarantine new animals entering your facility. In addition, domestic animals should be kept well away from potentially sick wildlife, their feces, or bedding. Be careful to change contaminated clothing and wash well before going into family or pet areas of your house. Also, by being alert to such issues and communicating their findings to the MNR and public health agencies, rehabilitators can play a significant role in protecting animal and human health.

Knowing Your Limits

An important part of being a wildlife rehabilitator is acknowledging your limitations. If you run into something new ask other wildlife custodians or your veterinarian for advice.

Wildlife custodians are not wildlife control personnel. However, by giving the public biologically-sound information, you can prevent animals from being injured or orphaned unnecessarily. Some wildlife custodians pick up sick or injured wildlife as their resources permit.

Knowing where to get information and help is an important part of being a successful wildlife custodian. All wildlife custodians should have the following numbers next to their phones:

- contact person at their local MNR district office
- local veterinarians who will help with wildlife cases
- other area rehabilitators and their areas of expertise
- local animal control officers
- humane society
- Public Health Unit nearest you
- the police services office nearest you
- your physician and nearest emergency room

Often in our eagerness to help an animal, we forget a very important thing -- human safety. You must always protect yourself and those who work with you. With a bit of training, almost anyone can be taught to restrain birds, even large dangerous ones. You may see experienced raptor wildlife custodians restraining eagles and owls without equipment. Such skill takes experience and an intimate knowledge of that particular species' behavior. Do not be the next well-meaning person to lose an eye to the stabbing beak of a heron, or to lose the use of one hand because a great horned owl tore tendons with its talons. Mammals can be even harder to handle. Without the

proper gloves, snare poles, etc. even small mammals like squirrels can give serious bites. Unless you are properly prepared to restrain a given species, you should not allow it to be brought to you.

The same advice pertains when you are talking to someone on the telephone. If a member of the public calls you and says that she/he has found an injured animal, what do you tell the person? Certainly you want the animal to receive help, but what are the chances that this animal could hurt the person trying to catch it? Find out more about the kind of animal and how the animal is acting. Think about what "weapons" this particular animal species has and give the caller specific advice on being careful. Try to avoid having the caller actually handle larger animals. Many smaller animals can be gently pushed into a pet carrier or cardboard box with a broom. If the person gets hurt while trying to capture an animal, what are your responsibilities?

Do You Want to be a Rehabilitator?

Although wildlife rehabilitation can be a very rewarding experience, it creates demands on your personal life. These need to be understood and appreciated before you become involved. Many enthusiastic beginners burn out after the first year or two of wildlife rehabilitation. To ensure that the rewards will outweigh the frustrations, it helps to have a realistic understanding of the responsibilities at the outset.

Time

Wildlife rehabilitation will take much more time than you expect. When you have living things in your care, you must be constantly attentive to their needs. For example, nursing baby mammals need to be bottle fed every couple of hours around the clock -- then the diets must be prepared, housing cleaned, cages built, water changed -- then, it's time to feed them all again!

It won't be long before you become known as the local person who takes care of animals. In an attempt to make sure that animals get to you as rapidly as possible, you will give your phone number to many local people: veterinarians, humane societies, pet stores, etc. They, in turn, will give your number to the public as someone who "knows about wild animals." This means that, irregularly, and unpredictably, you will get calls from people asking you what to do about the baby bird someone's cat just brought home, telling you that they just saw a fox hit by a car out on the highway, and so on and so on.

Very few people could respond to all these queries and still care for the animals they have, much less carry out household chores, spend time with their families, and (perhaps) work a job to pay for all this. You must decide what you can and can't do, then explain this to the person on the telephone. If you can't help, you should be able to refer the caller to someone who can. Wildlife rehabilitation should be, in large part, preventative rehabilitation. Much of your telephone time may actually be spent trying to convince people not to interfere with wildlife (the baby bird is just fine, so you should leave it alone; the raccoons will stop annoying you if you make your garbage cans inaccessible).

Finances

A common misconception is that "the government" pays for wildlife care. In reality, the expenses associated with wildlife rehabilitation are paid for by you, the wildlife custodian. These costs can add up quickly to hundreds (if not thousands) of dollars per year. You must buy food for the animals, caging or materials so that you can build housing, special handling equipment and protective clothing, medications, veterinary services, etc. You will also have to bear the costs associated with increased use of your car, telephone, electricity and other utilities. Then you'll

find you must buy books (lots of them!) to find answers to your issues, and you'll want to join organizations and go to conferences.

Many of the larger rehabilitation facilities solicit donations from people bringing in animals or try to get support from local civic groups, but very few wildlife custodians in North America receive enough in donations to cover their costs (let alone a salary or a wage).

Depending on where you live, it may be important to make sure that housing wildlife on your property meets municipal by-laws. Complying with these ordinances may be a significant expense, but will be particularly important if you have animals that you are keeping long term, or if you intend to rehabilitate potentially dangerous species.

Liability

If you provide advice to the public, have employees or volunteers, you should determine your liability and insurance requirements. It is unlikely that one of your animals will hurt someone, but what are the implications if it does?

Death and Euthanasia

Death and euthanasia are unavoidable parts of wildlife rehabilitation. You may not always recognize at the outset that an animal has little likelihood of surviving; some animals appear to do well for a day or two, but then die unexpectedly. Particularly if you stayed up late caring for the animal, spent money on its medications, and became attached to the animal, its death will upset you. You will have to be prepared for this type of thing to happen.

The worst part of dealing with death is often euthanasia (providing a humane death). There is no way around it; if you get into rehabilitation, you will have to euthanize or arrange for the euthanization of animals. Often animals arrive at your facility so badly injured that they need to be euthanized to prevent suffering.

Where euthanasia is required, you must consider who will do the euthanasia. Will you be doing it yourself? What techniques will you use? How will you dispose of the carcasses? You should have answers to these questions before you start receiving animals. Many humane euthanasia techniques require the use of injectable drugs and can only be performed by, or with the approval and supervision of, a veterinarian. It is important to talk to your veterinarian about this issue early. The *Minimum Standards* booklet has some helpful discussion about euthanasia agents. You should also discuss this issue with other authorized wildlife custodians, as the *Minimum Standards* booklet is US based and some euthanasia options are treated differently in Canada (e.g., use of T-61 and sodium pentobarbital).

Cultivating a Relationship with your Veterinarian

A good working relationship between a wildlife custodian and their veterinarian is essential. Talk frankly to a veterinarian about wildlife rehabilitation before you start taking animals and find out how interested they are in helping. Will services be performed for free, at a reduced cost, or will you be charged the same as a regular customer? Remember that the veterinarian has to make a living, and helping your animals for free or at a discount takes money from his/her pocket. With most veterinarians, it is best to start off slowly. Don't show up at the clinic with several animals and demand that they take time to help you; you would never be welcome again. Instead, make an occasional appointment for interesting or difficult problems that may intrigue them so much that they will want help you again in the future.

Wildlife custodians are not authorized to diagnose and treat all of an animal's ailments. Any medical treatment must take place under the supervision of a licensed veterinarian. The veterinarian might assist your efforts with services such as taking x-rays, doing blood work and fecal exams for parasites, performing surgery, tranquilizing animals, euthanizing animals, and disposing of carcasses. Over time, you may wish to learn how to do some of the laboratory work yourself, and your veterinarian would probably be glad to help you learn. You, in turn, might be able to help the veterinarian by accepting telephone calls from clients who want information about wildlife species or "orphaned" baby birds and mammals, and by referring new people to his/her practice.

Continuing Education and Wildlife Rehabilitation

Wildlife rehabilitation is a dynamic field in which improvements and changes occur rapidly. Some practices that were considered "state of the art" only a decade ago are no longer considered appropriate treatment or nutritional strategies. In order to properly help animals, it is essential for you to keep yourself well-informed. We have already suggested that you read books not only on rehabilitation but also on the natural history of the species with which you work. Joining organizations such as OWREN, NWRA and IWRC will help keep your knowledge base current, especially if you attend their training sessions and conferences as well as reading their publications. Volunteering with a more experienced rehabilitator or with a veterinarian will give you some hands-on continuing education. Other possibilities include taking courses at local colleges on topics such as ecology, animal behavior, wildlife biology, and the "ologies" of particular vertebrate groups (ornithology, mammalogy, etc.). If you have internet access, you could join online rehabilitation discussion groups and regularly browse the IWRC and NWRA sites. Note that there is no "quality control" over most of the web material on wildlife, so make sure you carefully assess the validity of each site.

ISSUES OF IMPORTANCE TO WILDLIFE CUSTODIANS

Identification of Species

Accurate identification of wildlife is critical. If you don't know what species an animal is, it is almost impossible to decide on correct captive housing and diets. In addition, knowing the specific identity of an animal will give you and your veterinarian some important clues as to which parasites or diseases are to be expected.

You can learn to identify many species from the field guides and other books listed in *Appendix Two*. Experienced wildlife custodians and local naturalist organizations can give you many valuable hints in identifying local species. In addition, taking trips to natural history museums or taking classes in mammalogy and ornithology can help immensely. MNR biologists can also be of assistance in identifying more difficult species.

Knowing the scientific as well as the common names for particular species is sometimes useful. A complete taxonomy (class, order, family, genus, species, and perhaps subspecies) is both daunting and, arguably, of limited practical significance in most decisions wildlife custodians must make. However, some acquaintance with scientific terminology can be a good tool: for example, knowing that the scientific name for the raccoon is *Procyon lotor* may help you remember the frequently-used scientific term for the raccoon roundworm, which is *Baylisascaris procyonis*.

Individuals and Populations

Wildlife and population biologists and conservationists view animals as members of dynamic and interacting populations. This view de-emphasizes the role of individual animals and focuses on preservation of quality habitat and genetically-viable populations. Conversely, animal welfare advocates and members of the veterinary community most often focus on animals as individuals. This view does not incorporate the complex issues related to the long term management of wildlife populations. It is important for you to appreciate that both points of view are valid, because wildlife custodians often are caught in the middle.

The degradation and destruction of wildlife habitats is the most significant threat to wildlife populations. Though very frequently the direct or indirect result of human activity, the majority of cases involving injury and death to individual wild animals does not impact on wildlife populations as a whole. However, large scale mortalities due to, for example, West Nile virus, rabies, lead poisoning, botulism, fowl cholera, or oil spills can threaten entire local populations of animals or even small populations of threatened and endangered species.

There is an increased interest in learning more about the fates of individual animals that have been rehabilitated and released. Techniques for marking and tracking rehabilitated wildlife range from simple (e.g., leg bands for birds) to complex (e.g., radio transmitting and receiving equipment), but all of them require the cooperation of biologists or other professionals who are qualified and licensed to use particular techniques. Marking of rehabilitated animals also has considerable potential for improving our understanding of the fate of these animals and the impact of rehabilitation on wildlife communities.

Common and Rare Species

In most wildlife rehabilitation facilities, it is impossible to give the best possible care to every injured or sick wild animal that is presented. As a wildlife custodian, you must decide which animals are likely to live, given the skill and technology you have at your disposal. Inevitably, people working with wildlife become drawn into discussions of why one species is more "important" or "valuable" than another. Importance is, of course, a subjective term. Some wildlife custodians believe that each living creature is equally important. Others might assign a low importance to nonnative species such as the rock dove (pigeon) and European starling. But it can also be argued that, by honing one's techniques on more common species, one develops a high degree of skill that can be applied to rarer wildlife species.

Rabies Vector Species

Any mammal species can be a carrier (vector) of rabies; the wild animals most likely to be infected are raccoons, foxes, skunks and bats. Lagomorphs (rabbits and hares) rarely carry rabies, and rabies is rare among rodents with the exception of woodchucks. Some jurisdictions do not allow the rehabilitation of rabies-vector species, and require any admitted into rehabilitation to be euthanized immediately. Other jurisdictions, including Ontario, authorize wildlife custodians to handle rabies vectors once they have completed specialized training and passed an exam. If you do plan to handle these species, you should be well aware of the risks not only you to but also to your family, your volunteers, and anyone else who might come in contact with these animals. Become familiar with the symptoms of rabies (and how similar they can be to symptoms of other conditions). Talk with your physician about the possibility of getting the pre-exposure vaccine. You should also talk with your local public health unit about the protocol for handling situations involving bites or other exposure to animal saliva.

What's Best for the Animal

It is important for all wildlife custodians to be realistic about what they have to offer, especially in the early stages of their practice. If an animal's injuries are beyond your skills, it would be in the animal's best interest to transfer it to someone with more clinical experience and equipment. If your cages lack the size or specialized features that are important for a particular type of animal, it might be better to send it to someone who has a better facility for that species. Particularly in dealing with endangered or threatened species, each rehabilitator must consider whether another facility might be better equipped to maximize the chances of recovery for that individual animal.

Releasability

Injured wildlife are treated, and orphaned wildlife are reared, with the express purpose of releasing them back into their natural habitats as soon as they are healthy and able to fend for themselves in the wild. No one wants to condemn a wild animal to life in a cage, nor do we wish to release severely disabled animals that will have little ability to compete and survive in the wild. It is important to constantly balance the likelihood of eventual releasability of an animal with an alternative of euthanasia.

A releasable animal must be able to fly, swim or run well enough to perform all the functions of a member of its species (i.e., find food, escape from predators, reproduce, migrate, etc.). Any animal that is tamed or imprinted is unlikely to breed successfully and may become a problem animal due to its lack of fear of people. Wildlife must be released in close proximity to its original point of capture, and in the appropriate habitat.

Releasing animals close to where they were found is of particular importance with adult animals. They have established territories and home ranges, and have learned the local resources necessary for survival. Release in the original location is less important for young animals that do not have established home ranges.

Please review the wildlife rehabilitation policy and the standard conditions of a Wildlife Custodian Authorization for more information about releasing rehabilitated wildlife in Ontario.

What if the Wildlife Can't be Released?

A wildlife custodian authorization does not allow you to keep nonreleasable animals in permanent captivity. Once you determine that an animal is not releasable you must decide if it would be suitable for long term captivity, or should be humanely euthanized. The purpose of wildlife rehabilitation is to release them back to their normal, wild existence. The decision to keep a wild animal in captivity for the remainder of its life is a significant one. Captivity can be extremely stressful for some species of wildlife.

If you choose to consider permanent captivity for a nonreleasable animal, you must contact your local MNR district office for direction on the animal's disposition. Under Ontario's Disposition of Live Wildlife policy, transfers will be considered in the following cases (in order of preference):

- a) to facilities that captive breed under an approved species recovery program
- b) to facilities licensed under the Animals for Research Act, or otherwise engaged in scientific or research programs which are of benefit to wildlife or the public
- c) to publicly funded and operated facilities with well developed educational programs, such as municipal zoos
- d) to privately operated zoos, to commercial falconry licensees, or to fur farms with an identified need for breeding stock.

Nonreleasable animals cannot be sold or bartered by the wildlife custodian.

Many schools, nature centers, museums and colleges utilize dead wild animals for teaching, exhibit, or research. Rather than just disposing of dead animals (even common species), you might check around to see whom you can help. Providing precise information about when and where the animal was found is important to scientists. In this way, you may be able to establish helpful relationships with other people interested in wildlife issues. Approval must be received from your local MNR district office before dead animals can be transferred to another person or facility.

HUSBANDRY

Housing

The *Minimum Standards* booklet contains a summary of housing considerations, including tables of suggested sizes of cages for housing wild birds and mammals. You should consult them before you start planning to build cages. Do note that you will need several different sizes of cage even for a single species: the cage size criteria are based on the medical (and age) status of the animal. Smaller cages are appropriate for animals that are younger and/or recovering from injuries. However, when a healthy, mature animal is nearing release, it needs more exercise; for these cases, it may often be beneficial to have much larger enclosures than those suggested in the guidelines as minimum sizes.

In addition to the size of an enclosure, there are many other factors to be considered. There is no such thing as a cage that is appropriate for all species of birds or mammals. In designing a cage, it is useful to have a specific type of animal in mind and talk to people who have worked with those species before. If outdoors, the cage must include an area that shelters the animal from the elements and provides shade during the hot summer months. In winter, fresh, ice-free drinking water should be available at all times for most species (an exception might be raptors, which obtain most of the water they need from their prey). Bird-bath heaters or heaters designed for outdoor dog bowls may be lifesavers in the winter. Special discs that are heated in a microwave can hold heat for several hours, and may also be used to keep water bowls as well as foods from freezing.

Cages can be made of many materials, and what you choose depends on what species you wish to house. In general, wire caging is not appropriate for most birds and especially raptors, which will often damage their feathers and beaks by flying onto the wire to such a degree that they cannot be released. If wire is used in the construction of flight cages, a layer of netting should be added to the inside so that birds cannot come into contact with the wire. By contrast, however, many mammals often do well in wire cages. Upright portions of cages may be made of wood, metal, fiberglass or other materials. If a species tends to chew on its caging (rabbits, rodents, etc.), use nontoxic materials. The *Minimum Standards* booklet provides much more detail on cage design. The flooring of the cage must be made of something that can be cleaned. Concrete is easy to clean, but is very cold in winter and can be very hard on animals' feet. Soil or sand floors can be excellent, but the top few inches will become contaminated with feces and parasites and must be shoveled and/or sifted out regularly (how often will depend on how many animals of which species are housed in the cage -- you may need to replace the substrate weekly, or only a couple of times per year). Because of the dangers associated with the *Baylisascaris* parasite of raccoons,

no other species should ever be housed in a cage that raccoons have occupied, with the exception of stainless steel cages that can be heat-sterilized with a blowtorch.

Cages must also afford psychological well-being for an animal. You must provide sight and sound isolation from things that might frighten and stress the animal. For example, exposure to predators, people and pets. You would never want to place a prey species (e.g., a rabbit) in a cage where it could see or hear one of its natural predators (e.g., a great-horned owl). Such exposure could literally frighten the prey animal to death, or provoke attempted attacks by the predator species.

Always keep in mind the risks from predators. It is likely that raccoons, foxes, opossums, owls and other predators and scavengers will wander about your cages at night. They would be only too willing to injure or eat one of your rehabilitating animals. Raccoons, in particular, can become quite adept at reaching into cages, pulling animals over to the bars, and crippling or killing them. Remember that domestic animal (especially dogs and cats) are also predators and should not be permitted anywhere near your rehabilitation housing.

If you are going to house digging species (e.g., woodchucks, foxes, etc.), it is important to make sure that the walls of the cages extend well below ground level -- preferably 3 feet. It is also helpful to have the below-ground portion of the caging angle in towards the cage. Alternatively, the entire bottom of the cage could be wired (below the cage substrate).

Some animals require soft bedding, which prevents some pressure-type ulcers (bedsores) and can help insulate and keep the animal warm. Many materials are available, but it is important to avoid any that can unravel and become tangled around an animal's tail, limbs, tongue, digits, etc., which could cut off circulation and cause serious problems. Great caution must be exercised in using hay for bedding. Many wildlife species are extremely sensitive to fungal respiratory diseases in captivity, probably because they are so stressed. Many raptors are especially vulnerable. Mold spores are often abundant in hay, and if hay is used for bedding, many of your patients may die from the fungi. A good rule is never bring hay into any indoor animal facility. Animals that need hay for food, such as ungulates, should be housed some distance from your other patients.

Disinfection

An important part of caring for captive mammals and birds is environmental sanitation. When there is the potential for zoonotic diseases, strict personal hygiene and good cage sanitation are essential. For most indoor cages and smaller outdoor cages, prompt removal of all fecal material is important. Some larger outdoor cages (e.g., flight cages) may require less frequent cleaning, depending on the type and number of animals that occupy them. Washing your hands between handling of animals or cleaning of cages is also important.

It is important to practice responsible waste disposal of any materials used in the rehabilitation of wildlife. Of special concern is the disposal of raccoon feces due to potential problems with *baylisascaris procyonis* (raccoon roundworm).

Many types of disinfectants are available; most of them don't work if there is organic material present, so scrubbing clean prior to disinfection is required. Label instructions should be followed closely to ensure use of the proper dilution and safety to the animals. Animals should always be removed from cages prior to application of the disinfectant. These chemicals should be allowed to remain on surfaces (cages, dishes, etc.) for at least 10-20 minutes to allow maximum efficacy, then

the solution should be rinsed away thoroughly with several rinses of fresh water. Many disinfectants can hurt animals if they aren't rinsed away completely. Also, many products are more effective when used in hot water. It's a good idea to read the label of any disinfectant and follow the manufacturer's recommendations for use.

There are several broad categories of disinfectants, including phenolics, halogens, quaternary ammonium compounds, and biguanides. An ideal disinfectant should have properties such as broad spectrum of activity (it kills many types of disease organisms), nonirritating, nontoxic to animals and humans, noncorrosive to surfaces, inexpensive, and not readily inactivated after application. Because no single disinfectant has all of these properties, different agents may be more suitable for individual situations. Ask your veterinarian what products he/she likes. The *Minimum Standards* booklet contains more information about specific disinfectants.

Nutrition

Wildlife eat many different kinds of foods. Some species are broad generalists – an omnivore eats a variety of foods, both plant and animal. Raccoons, bears, and skunks are omnivores, as are humans. Other species are more specialized however. Faunivores, or animal-eaters, include carnivores (which eat primarily terrestrial vertebrates), piscivores (which eat primarily fish), and insectivores (which eat primarily insects). Florivores, or plant-eaters, may be herbivores (eaters of mostly leaves, buds, shoots, grasses), granivores (eaters of mostly grains and hard seeds), frugivores (eaters of mostly fruits), or have even more refined specializations. As the terms “primarily” and “mostly” suggest, “specialization” is sometimes relative: many birds, for example, consume some insects and some fruits or seeds, and the proportions of each may vary both seasonally and with the age of the bird. Most passerine nestlings, for instance, are fed primarily protein, regardless of what their specialization will be as adults; vitamin and mineral requirements change when a bird is brooding or molting.

It is important to know which foods are consumed by the species you rehabilitate. For example, you should not attempt to feed vegetables to a strict carnivore (like a mink or bobcat). Identify your species and approximate age as soon as possible to ensure that every animal in your care has the nutrition it needs to heal or grow.

A great deal is known about the nutritional needs of wildlife, and many diets for captive wildlife have been published. However, one of the most important considerations about an animal's diet is whether or not the animal will eat the food you offer. Animals in captivity are often sick or stressed, and you may need to call more experienced wildlife custodians to get tips on what stimuli will work to get a particular wildlife species to eat initially. It is sometimes necessary to feed an animal through a crop or stomach tube (gavage) if it cannot eat for itself. Passing a feeding tube is not a difficult skill, but incorrect technique can result in fluid being introduced into an animal's lungs, which can be fatal to the animal. Your veterinarian, a more experienced rehabilitator, or the basic skills courses given by rehabilitation organizations, will help you to learn this technique.

In general, adult animals are easier to feed than babies. Adults have already acquired skills in obtaining food and simply need to be supplied with a balanced diet that they will eat – they are not growing rapidly and will be in captivity only for a short period. Once you know what an animal eats in the wild, it is conceptually not too hard to craft a captive diet. Carnivores, for example, can be fed smaller vertebrates. But where will you get them? It is generally not a good idea to feed dead animals you find outside (such as road-kills) to your predators. These dead animals may have suffered from an illness that could be passed on to your rehab animals. Surplus laboratory

rodents (control groups) are sometimes available, and can be stored in the freezer until you need them. Trappers may be able to provide reasonably safe carcasses. Some mammal species (e.g., raccoons, foxes) can eat commercial dog foods as part of their diets and others (e.g., bobcats) cat foods. Captive wild rabbit and rodent diets can contain foods designed for domestic rabbits or laboratory rats, respectively. A variety of fruits and vegetables can be provided as part of the diet, but should not be the sole foods utilized. Good quality alfalfa hay is an excellent source of nutrition for some animals (e.g., rabbits), but should never be used if it smells musty or moldy. If you're not sure what to feed an animal, do your research and ask other wildlife custodians for advice.

As a general rule, an adequate supply of fresh, clean water should be available at all times. Weakened, sick, or bandaged animals must be watched closely as they can fall into their water dish and drown. A baby animal should not be given a water dish until it is mature enough to eat by itself. Food and water dishes must be shaped (in size and depth) so that they are appropriate for the animal you are feeding. For instance, a rabbit should be fed in a flat dish, so that as a prey animal, it can see approaching predators while eating.

The next issue is whether or not you are feeding the animal enough. Weighing animals on a regular basis is the best way to determine if an animal is receiving enough of the correct food to sustain its weight during its growth/recovery. It is vital that new, ill or anorexic animals, be weighed every day. A small emaciated animal can lose enough weight in one or two days to actually die of a 'negative energy balance' (starvation). As you progress in your learning, you should learn how to calculate the daily caloric requirements for the species you rehabilitate; there are formulas available through the various rehabilitation organizations or manuals that will teach you how to calculate the number of kilocalories necessary for each animal, based on weight, condition and age.

Other than caloric intake, it is critical that animals get enough calcium (Ca) and phosphorus (P), and in most cases that the Ca to P ratio is about 2:1 (i.e., there needs to be about twice as much calcium in the diet as phosphorus). If a diet contains either too little calcium in an absolute sense, or too much phosphorus relative to the amount of calcium, a nutritional problem called metabolic bone disease will result in bones that are deformed or prone to fracture. In some cases, calcium amounts will need to be increased to facilitate reparative skeletal growth or to correct previous calcium imbalances. Muscle and organ meats (e.g., hamburger, chicken breast, liver, etc.) and insects are examples of foods that have extremely high levels of phosphorus relative to calcium; calcium supplements in the appropriate amounts must be given to animals whose sole diet is either of these foods. Again, as you progress, you should learn to calculate the amounts of calcium and phosphorus; until you do, however, you should not try to formulate your own diets for wild animals, but rather to refer to well-researched, factual based diets available through your rehabilitation organizations or wildlife based diet manuals. Young, rapidly-growing animals are the most sensitive to Ca:P imbalances, so getting their diets right is crucial (see "Orphans" section below). Beware of "internet diets" – much of the information available on the internet is not based in fact, and can be damaging or even fatal to wild animals.

Stress

Stressors are external influences that impel an animal to either attack what they perceive as threatening (or prey) or try to escape from what they perceive as threatening ("fight or flight"); they exert stress on the animal. Physiologically, a little stress may not be harmful, but animals in captivity are often subject to so many stressors that they can actually cause harm. For wildlife

custodians, there are two main things to worry about. The first is that, in trying to escape or avoid the stresses, the animal will injure itself or you. The second is that increased stress may make the animal less interested in food, and definitely makes the animal more susceptible to disease. Too much stress makes an animal's immune system function less well, and weakens its ability to fight off infection.

One of your main jobs is to do whatever you can to reduce or eliminate the stress on your wild patients. Stress reduction practices include such things as minimizing handling, providing sight barriers (so that the animals cannot see other animals or people), limiting noise (from radio, stereo, televisions, etc.) and talking, not allowing your dogs and cats within auditory or visual range of your wild patients, and giving medications in the food rather than handling the animal to give injections.

SPRING "ORPHANS"

Each spring, most wildlife custodians are besieged with calls from concerned members of the public who have found baby animals. Handling these calls can take a lot of your time. But in the public's mind, you are the person in your community who knows and cares about animals. It is important that you give out correct information. If you can't, make sure that you can provide telephone numbers for nearby wildlife custodians or other wildlife professionals who are willing and able to answer the person's questions. In fact, most of the young animals are not truly orphaned or in need of human help. But the way in which you convey the correct information to the public is an important tool in public education and public relations.

In educating the public, you must often convince adults and children not to try to "rescue" most wild bird babies. Wildlife custodians often hear people say, "I had to chase this bird for ten minutes before I could catch it to help it -- wow, could it run!" Somehow, you have to sensitively tell these people (who just spent a lot of time and effort to catch the bird and bring it to you for help) that catching the bird might not have been the best thing, and that now they must spend more of their time to put it back! People usually understand when you explain how hard it is to raise baby birds and that no human can do as good a job as the real parents.

The young of most bird species leave the nest before they can fly or feed themselves. Precocial species (e.g. most waterfowl) are mobile and self-feeding even earlier. They leave the nest within hours of hatching and follow the mother about. Although these young may get separated from the parent(s), they are most often picked up by children or misunderstanding adults simply because the parent(s) ran or hid when the people approached.

Young of altricial species (e.g., raptors, jays) may leave the nest ("fledge") a week or more before they can fly. These fledglings hide under bushes or in shrubbery, or perch on low limbs of trees; periodically, the adult birds will fly to and feed them. It is usually these young that children find and "rescue" in the spring. What people don't understand is that these birds are exactly where they are supposed to be and behaving in a normal way. If left alone, the parent birds will return to feed the young within a half hour or so. The finders may assure you that they watched for parents, but that no adult birds appeared. If you question them carefully, however, they'll often admit that they were "watching" quite close to the nest. It's hardly surprising that the adult birds would not visit the nest with these large predators nearby. In the great majority of cases, the appropriate action is to put the baby bird back exactly where it was found and go away. Any "watching" of the

youngster should be from an unobtrusive distance, perhaps with binoculars. However, the caller must also be advised to keep the family cat(s) indoors for at least a couple of days -- until the bird begins to fly.

What about the situation in which a younger, unfeathered or partly-feathered bird (a "hatchling" or a "nestling") has fallen out of the nest well before it was ready to fledge? Assuming that it's active and not injured or hypothermic (very cold), the right answer is to put it right back into the nest as soon as possible. It is a myth that birds will smell your touch and reject the baby; birds have a very poorly developed sense of smell. If the caller can't find the nest, it may be okay to put the baby into another nest of the same species (if the young are not too much different in age); most adult birds will readily "adopt." Your local scout troops, nature centers and birdwatchers may be able to help you locate nests. This technique often works beautifully for hawks and owls as well as songbirds, and can greatly decrease your work load and level of stress. However, putting several babies into a nest that already contains several might put too much of a strain on the parents, who may not be able to feed a clutch that has suddenly doubled in size.

If a nest with young has fallen out of a tree due to a storm or overzealous pruning, the nest can be secured back in the tree as close as possible to its original location (a few feet one way or the other won't matter). If the nest was destroyed, a reasonable substitute can be made by lining a wire frame or plastic berry basket with twigs and dry grasses (or whatever types of materials were used in the original nest), then securing this substitute nest in the tree, out of direct sunlight. Do not use a solid container like a plastic margarine dish, as it will collect water and drown the young.

Certainly, there are times when nestling or fledgling birds should be rescued, however. If a family or neighborhood cat that has discovered a fledgling cannot be kept inside until the bird is fully flighted, intervention may be called for. Of course, if a baby bird on the ground is cold, obviously injured, or if the caller is sure that the parent(s) is/are dead or have not tended the baby for a prolonged period, it should be retrieved and brought to you. If the finders cannot get the bird to you right away, they should be advised to put it in a warm, quiet place away from pets and children. Most young birds that are gaping (opening their mouths to solicit food) can safely be fed pieces of kitten or cat chow that have been soaked in water until they are soft. Baby birds should not be fed hamburger, bread, or milk.

Many of the same rules that apply to baby birds also apply to baby mammals. Most are not orphaned and can be put back where they were found. Some species are altricial (e.g., fox) and some are precocial (e.g., hare). They need to be kept warm and quiet, until they can be delivered to you.

Care of Young Birds

Most of the young birds received by rehabilitators are "passerines" – that is, birds in the Order Passeriformes, which means, literally, "sparrow-shaped." Passerines are commonly referred to as "songbirds," even though not all "sing" in the usual sense (eg. Blue Jays or Blackbirds). Many captive diets have been described for young passerines, but not all of them meet the birds' nutritional needs. Regardless of the feeding strategy of the adult, most passerines feed their nestlings insects, which are high in protein but low in fat and carbohydrate. Recent research indicates that traditional rehabilitation formulas based on dog kibble with added baby cereal or egg don't meet the protein requirements of growing songbirds. Hand-rearing formulas for psittacines (birds in the parrot family) are also much too low in protein for most wild birds, despite claims on some product labels. Well researched, fact-based songbird recipes are now available through

your rehabilitation organizations and related publications, such as the IWRC journal archives – they may seem complicated to make at first, as there are many ingredients necessary to achieve optimum nutrition, but once you are familiar with them, they are not as time consuming as you might think. Typically, passerines need to be fed all they will consume *at least* once per hour (younger birds should be fed more often) from dawn to dusk.

If young birds do not gape (open their mouths) for food, you may be dealing with a species that doesn't normally gape; alternatively, the baby could be confused, hypothermic or ill. If the bird is confused, it will often learn by watching others, or it may need some coaxing from you (including opening the beak if necessary).

Syringe-feeding baby passerines a thick liquid formula takes a little practice; you have to make sure you deliver small amounts of formula to the back of the throat, beyond the glottis, so they do not inhale it. Always ensure that the outside of the syringe is clean and dry. Wait for them to swallow before giving additional formula. The food you feed will go into the crop where it is processed more slowly into the digestive tract. One rule of thumb is that crop capacity in milliliters is approximately 5% of the bird's weight in grams. Other techniques for feeding nestlings can be quite messy, and excess formula may be inhaled as a result. Once hydrated, it is rarely necessary to give a healthy baby passerines being syringe-fed extra water; their food should provide all the necessary fluids. Most young birds will defecate just after each feeding. The fecal material should be removed immediately to prevent the young bird from soiling itself.

Raptors are usually hand-fed mice or other animal protein when they are young. The digestive process is still developing in a very young raptor, so the feeder animal should have the tail, feet, skin and intestines removed, and the rest of the animals should be cut up and reduced to a 'mush' before dropping small amounts into the bird's mouth. As the bird develops, skin and smaller bones can be added, until eventually the fledglings are eating whole animals. If feeding a bird that is of imprinting age and tendency, puppets should be used to imitate the parent, or surrogate animals can be used if available.

Young *Phasianids* such as bobwhite or grouse are precocial birds and are able to feed themselves immediately after hatching. Appropriate foods (including insects and ground duck chow) should be scattered on the floor of their cage. Water should be offered in a flat dish with pebbles, to ensure nestlings do not become too wet and possibly hypothermic (or even drown).

As birds mature, they will begin to feed themselves from the natural foods you supply, so ensure that the correct foods are present at the appropriate age for the species you are raising.

Care of Young Mammals

Although all baby mammals are fed milk, the composition of milks varies considerably among species both in terms of relative amounts of macronutrients (protein, fat, carbohydrate) and in terms of the percent of solids (the thickness of the milk). Cow's milk (including evaporated and condensed versions) and human infant formulas, or formulas with soy protein, do not meet the nutritional needs of infant wild mammals. Milk replacers for domestic puppies and kittens have traditionally been used, however, milk substitutes designed for a variety of wild mammals are now available. For some species, these products offer better matches to the composition of mothers' milk than can be provided by milk substitutes formulated for dogs and cats. Charts exist showing recommended formulas (such as Zoologic or Fox Valley), as well as the amount and frequency of feeding based on the animal's weight (see *NWRA Principles of Wildlife Rehabilitation*).

Orphaned mammals should be weaned onto a balanced diet that is appropriate for the species. In many cases, commercial products such as dog (e.g., for raccoons) or cat (e.g., for bobcats) kibble, or rodent block (e.g., for squirrels) can form a substantial part of the weaning diet since they are balanced for calcium and contain a number of important vitamins and minerals. As your nutritional knowledge improves, you should strive to include a higher percentage of the animal's natural foods.

Taming, Habituating, and Imprinting

It is well known that the more comfortable a wild animal is around people, the less likely it is to survive and function well in the wild. Wildlife that consistently seek out human contact will be hit by cars, shot, or considered pests. As a wildlife custodian you may be torn; one of the rewards of doing wildlife rehabilitation is getting to experience close contact with the animals, but the more inappropriate contact you have, the worse it often is for your charges.

Taming is a process by which wild animals learn not to fear humans, and possibly also to form some social attachment to humans. Habituation is a process by which an animal learns not to respond to stimuli to which it is frequently exposed without any particular consequences. Animals in rehabilitation may become habituated to the human activity around them. Because you will be in daily contact with the animals you rehabilitate, some taming and habituating may be unavoidable, particularly when you are hand-raising young birds or mammals. You should not allow animals in rehabilitation to become habituated to the presence of your pets, which may be predator species in the wild. You can avoid taming by making sure you raise animals with others of their own species, and by minimizing handling or exposure to people, especially once the young are feeding independently.

Imprinting is a process by which the young of some animals learn what species they are as a result of being exposed to the sights and sounds of their parents and their siblings. It occurs rapidly, during "critical periods" in development, and is considered irreversible (it persists for the life of the animal). True imprinting may not occur in young mammals, and some researchers believe that, among birds, it is a more rapid and powerful process in waterfowl and raptors than in passerines. In general, precocial species imprint much more rapidly and at a much younger age than altricial species.

Imprinting is a natural and normal process that is important to the survival of wild species, but problems can occur if animals imprint on inappropriate "parents." Improper imprinting can easily occur in rehabilitation; animals exposed to human caretakers during their critical periods learn that their "parents" are human and develop a human identity for themselves that persists into adulthood, when they may attempt to socialize and even mate with humans rather than with members of their own species. Although this may sound amusing, such animals are often killed, because unknowing people think they are being "attacked" by a wild animal. In addition, improperly imprinted animals are not effective members of their species because they do not reproduce.

Taming and imprinting are separate processes. If a bird was raised by its parents through its critical period for imprinting, subsequent rearing by a human rehabilitator may result in taming (or habituation), but not inappropriate imprinting. Conversely, a bird that has been raised by humans during its critical period for imprinting may, if subsequently given very limited contact with

people, become wild. But human imprinting will become evident in the breeding season, when the bird will display courtship and mating behaviors toward people.

Intentionally or unintentionally taming or imprinting wild animals to humans is not appropriate and should not be allowed to occur in your rehabilitation practice. A human-imprinted animal is not releasable; because of the limited opportunities for placement, most of these animals must be euthanized. Imprinting to humans can be avoided by making sure that the young of species that are particularly prone to imprinting (owls, for example) are raised in the company of adults or at least other youngsters of their own species.

Regardless of the importance of imprinting for a given species, being properly socialized can make the difference in the eventual outcome for that animal. Some novice rehabilitators may initially think it's "cute" to have the tame blue jay they raised riding around on their shoulders after its release, but they often learn the hard way (e.g., when the bird was shot by a neighbor who noticed it "acting funny" and was afraid it had a disease) that a bird like this does not have the behavioral skills necessary to survive after release.

REPTILES

The reptiles most frequently admitted to rehabilitation in Ontario are turtles; the two most common are painted turtles and snapping turtles. Painted turtles have a smooth carapace (top shell); they get their name from the red and yellow stripes that run longitudinally from neck to nose, and from the red pattern along the margin of the carapace. Snappers may be recognized by the prominent jagged edge along the rear of the carapace and their tendency to bite or "snap." The tail of a snapping turtle is usually at least as long as the carapace, and has a saw-tooth-shaped bony ridge. Large snappers can be safely picked up by grasping the carapace at the rear, with one hand above each back leg (pointing the head away from you). Alternatively, they can be gently pushed into a box.

The most common reason for a turtle coming into rehab is that it has been hit by a car. Turtles may be crossing a road for a variety of reasons, but many cases are females looking for a place to lay eggs. If a female carrying fertilized eggs is killed, her eggs may remain viable for several hours. A more experienced wildlife custodian or herpetologist (biologist who studies amphibians and reptiles) can coach you through the removal and incubation process.

If a turtle is admitted with a cracked shell, flush the wound with copious amounts of saline solution. Small cracks with minimal displacement can be stabilized using thin strips of duct tape placed across the fracture. This allows access to the wound for monitoring and treatment. Larger unstable fractures, or fractures that penetrate the coelom, should be treated by an experienced veterinarian. Shell fractures are really no different than bone fractures in birds and mammals, and in most cases need to be repaired under anaesthetic once infection is controlled. Wounds not penetrating the coelom can be packed with Silver Sulfadiazine cream. Hydrotherapy (q24-48 hrs) is invaluable as it greatly accelerates wound healing.

Epoxy can in certain circumstances be used to treat shell fractures, but in general it should be avoided due to the frequency of complications such as infection. Wounds under epoxy cannot be monitored, nor can necrotic material (dead tissue) be debrided or cleaned off.

Painted and snapping turtles are both aquatic turtles; they will not eat unless their heads are underwater. Injured turtles may be placed in a container with water just deep enough to cover their plastrons to allow them to drink. They should be placed in normal housing (tank and basking surface) as soon as the shell fracture has been repaired and the coelom is intact or sealed. They should be offered a variety of foods such as commercial turtle food, mealworms, bloodworms, earthworms, waxworms, crickets and occasionally a small fish. Never feed meat. Snapping turtles also consume much aquatic vegetation in the wild (two-thirds of their diet). It is important to offer them greens such as romaine, dandelion, endive and escarole. Turtles should never be fed spinach, kale or collards. Feeding larger turtles can be facilitated by feeding turtle cubes- greens, pellets, and other foods pureed with gelatin. Always use a calcium and vitamin D3 supplement. Turtles should be kept in a warm environment with a temperature gradient, and use of UVB light bulbs are beneficial.

TRIAGE AND FIRST AID

Triage is the process of sorting out the medical priorities of your patients to decide which cases will be treated first (because their injuries are urgent and life-threatening), which can be treated later (because their injuries are minor), and which will not be treated at all (because their injuries are too severe to be repaired). As hard as it is, you will occasionally have to make a conscious decision not to treat a problem, or even euthanize an animal, because there are other higher priorities. Volunteering at an established facility is the best way to gain experience regarding (a) the kinds of injuries that will render an animal nonreleasable no matter how expert the care, and (b) how best to treat injuries from which an animal may recover.

The initial step in triaging is being able to perform a thorough, accurate and relatively stress-free physical examination. This is something that should be practiced with an experienced wildlife custodian and your veterinarian until you are confident that you are performing the exam correctly. There are many aspects of the physical exam that should be considered. Proper handling and restraint of each species is essential to ensure that neither the animal nor the handler is hurt. The use of examination gloves prevents the bacteria on your skin from infecting any wounds the animal may have, and helps to decrease the risk of your exposure to a zoonotic disease. Patients should always be handled in such a way to prevent any injuries from becoming worse. This is particularly important when there are fractures present. The physical exam should be conducted in a consistent, systematic way, and the information you obtain recorded in an organized fashion.

Wildlife rehabilitation facilities are quite similar to veterinary emergency clinics, in that most of the animals admitted require medical attention. Wildlife custodians are presented with a wide range of injuries and illnesses that they must be able to identify. The decision can then be made to treat the animal, refer the case to a more experienced wildlife custodian, refer the case to a veterinarian, or to euthanize the animal. It is important to have a good understanding of the common diseases and injuries that you will see in the species admitted to your facility. For each condition you should be able to describe what symptoms you would expect the animal to be exhibiting. There are many clinical symptoms that are common to more than one disease or condition and you will need to be able to make a list of these possibilities. For example, paresis in a duck could indicate spinal trauma, head trauma, botulism, or lead poisoning to name a few. With experience you will learn to narrow down the problem based on the little history you have, the time of year, and other clinical signs the animal is exhibiting.

Many times an animal will be experiencing more than one problem at the same time, and the primary problem is not always the most obvious. For example, a hawk that was hit by a car, may have been on the road because it was suffering from organophosphate poisoning. Or a raccoon may have a fractured leg after falling from a tree, but fell from the tree because it was suffering from distemper. Many cases are quite convoluted and require some detective work to unravel.

When you admit a wounded animal, it is always tempting to treat the most visible injury right away. However, in reality, a broken limb or even a fairly large wound is not often immediately fatal. In many cases, the best initial treatment might be to simply put wounded animals in a quiet and relatively dark place, where they can recover from the stress of being captured and transported, before you conduct a more thorough physical exam. There are some conditions that do need to be dealt with right away, however. Always ensure that the animal has an open airway and is able to breathe. Any major bleeding needs to be stopped. Seizure activity will have to be controlled, and in acute poisonings rapid treatment is essential. Many animals will also be in shock, whereby the circulation fails to provide adequate oxygen-rich blood to organs throughout the body. It is essential to know how to recognize and efficiently treat these life-threatening conditions.

The administration of medications, such as antibiotics, analgesics, anti-parasitics, and drugs for euthanasia, is an important aspect of providing first-aid for wild animals. These medications have to be administered under the supervision of a veterinarian. You will need to establish protocols with your veterinarian so that you know what medications to give, when they should be given, what the dose should be, what route it should be administered and how frequently this should be done.

Learning to assess and reassess problems in sick, injured and immature wildlife takes much time and practice. Similarly there is much to know about treating medical problems in wildlife, including use of rehydrating fluids, gavage feeding, wound management, fracture immobilization, and the feeding of emaciated animals. These skills are best learned by working closely with an experienced wildlife custodian or veterinarian and by taking basic skills courses offered by groups such as the IWRC. As you develop these skills, you will become more confident in your identification of problems and treatment decisions.

ZOONOTIC AND EPIZOOTIC DISEASE

Wildlife are susceptible to a number of diseases, some of which may be spread to humans. A good discussion of many diseases may be found in the Veterinary Section of the *NWRA Principles of Wildlife Rehabilitation*; only a very brief overview will be presented here. Zoonotic diseases that may affect wildlife custodians include Lyme Disease (spread by a tick from reservoirs such as mice and deer), Aspergillosis (caused by a fungus particularly common in the respiratory systems of aquatic birds and transmitted by the inhalation of spores), Tularemia (caused by bacteria common in rabbits), Leptospirosis (caused by a bacteria which is common in urine and feces, particularly in raccoons), Tuberculosis (caused by a bacteria which can be present in deer and elk), and Powassan (caused by a virus which can be found in ticks on woodchucks). Three additional zoonoses of which wildlife custodians must be particularly mindful are rabies, visceral larval migrans and West Nile Virus.

Rabies

Rabies is caused by a virus; all mammals can transmit the disease, but the major reservoirs are foxes, skunks, raccoons, bats and coyotes. Animals that are rarely infected include deer, lagomorphs (rabbits, hares), and rodents with the exception of woodchucks. Never forget, however, that even a low-risk mammal may have rabies (e.g., a fawn admitted with wounds could have been bitten by a rabid coyote). Birds and reptiles are not considered susceptible to rabies. Transmission typically occurs when the saliva of an infected animal contacts the nerve tissue of another animal -- most often by a bite, but possibly through cuts on human hands. Rabies is very difficult to diagnose in an animal by symptoms alone: the signs may include unusual disposition (which could manifest either as atypical aggressiveness or friendliness), increased salivation, poor coordination, and paralysis. However, neurologic signs that resemble those of rabies are found in other wildlife diseases, such as distemper, larval migrans, and lead poisoning. Definitive diagnosis requires post-mortem examination of brain tissue. Rabies is considered to be 100% fatal in humans. People who plan to rehabilitate rabies-vector species should talk with their local public health official, their veterinarian, and their personal physician about issues such as risk of exposure to members of the public (who might try to capture an infected animal) as well as to wildlife custodians, proper protocol for reporting and treating bites (or other contact of saliva with unprotected skin), and the possibility of pre-exposure vaccinations. . If you are bitten by a wild mammal you are caring for always wash such wounds carefully with soap and water. The animal should be euthanized, and its head submitted for a rabies examination (refrigerate or freeze). While awaiting results, notify your family physician. Because some wildlife species (e.g., raccoons, skunks) may incubate rabies for long periods, quarantine is not considered acceptable.

In Ontario, all wildlife custodians who want to rehabilitate raccoons, skunks, foxes and bats must successfully take the Ontario Rabies Vector Species course and pass the associated exam.

Visceral Larval Migrans

This is a condition that results when the eggs of certain animal parasites are shed in feces and are subsequently ingested by another species; when the eggs hatch, their larvae penetrate the digestive tract and migrate to other bodily systems, where they can cause damage to central nervous system, blindness and death. The most widely-known agent is the roundworm parasite of raccoons, *Baylisascaris procyonis*. Although prevention may seem very straight-forward (do not ingest raccoon feces!), it must be kept in mind that the eggs remain viable for extraordinary lengths of time and despite conventional cleaning and decontamination procedures. A cage that has once housed raccoons should not be used subsequently for any other species.

Salmonella

Salmonella infection is a bacterial disease that occurs commonly in birds, mammals, reptiles and humans. Transmission is primarily through the ingestion of fecal material from any infected animal. The infection may not manifest itself with clinical signs. The animal may have a latent infection, harboring the pathogen in its lymph nodes, later shedding the organism in its stool intermittently. In all species, clinical signs include; abdominal pain, vomiting and diarrhea. Prevention of the spread of this disease depends primarily on good hygiene. Washing your hands before and after handling any animal and especially in between ill animals is important.

West Nile Virus

WNV produces illness primarily in birds. Although it is widely agreed that this epizootic disease is spread among birds by mosquitoes, other means of transmission are possible (infected birds may

shed virus in saliva and feces). WNV has been identified in over 100 species of birds, with those in the corvid family (crows, blue jays) being particularly susceptible. Among raptors, great-horned owls and red-tailed hawks seem to have been affected in large numbers. Mammals (including humans) may also be infected, but are less likely to become ill and generally do not accumulate sufficient virus to be infective.

WNV causes encephalitis (inflammation of the brain). If a high-risk bird demonstrates neurological dysfunction in the absence of evidence of injury, then WNV should be suspected, particularly if body temperature is elevated. Other signs include anorexia and weight loss, excessive sleeping, head tremors, lack of awareness of surroundings, ataxia, and seizures. Some infected birds recover with supportive care (fluids, good nutrition, and warmth). Information about WNV is growing as rapidly as the virus is spreading; rehabilitators should consult professional websites that are updated frequently (see *Appendix Two* for suggestions).

Lyme Disease

Lyme disease is caused by a bacteria and is transmitted to humans by the bite of infected deer ticks. Typical symptoms include fever, headache, fatigue, and a characteristic skin rash. If left untreated, infection can spread to joints, the heart, and the nervous system. Most cases of Lyme disease can be treated successfully with a few weeks of antibiotics. Steps to prevent Lyme disease include using insect repellent, and removing ticks promptly. The ticks that transmit Lyme disease can occasionally transmit other tick-borne diseases as well.

Aspergillosis

Aspergillosis is a disease caused by inhaling the spores of a fungus. The fungus is found on decaying matter. Aspergillosis is frequently found in birds especially waterfowl, corvids, and captive raptors but rarely in mammals. It is not usually considered contagious but infection can occur in individuals with impaired immune systems. Infected birds will often be emaciated and have difficulty breathing and exhibit symptoms similar to lead poisoning.

Tularemia

Tularemia, also known as “rabbit fever,” is a disease caused by a bacteria. Tularemia is typically found in rodents, rabbits, and hares. People can become infected through the bite of infected insects (most commonly, ticks and deerflies), by handling infected sick or dead animals, by eating or drinking contaminated food or water, or by inhaling airborne bacteria. Symptoms can include skin ulcers, swollen and painful lymph glands, inflamed eyes, sore throat, mouth sores, diarrhea or pneumonia. If the bacteria are inhaled, symptoms can include abrupt onset of fever, chills, headache, muscle aches, joint pain, dry cough, and progressive weakness. Tularemia can be fatal if the person is not treated with appropriate antibiotics.

Leptospirosis

Leptospirosis is a bacterial disease that affects humans and animals. It causes a wide range of symptoms, and some infected persons may have no symptoms at all. Symptoms of leptospirosis include high fever, severe headache, chills, muscle aches, and vomiting, and may include jaundice (yellow skin and eyes), red eyes, abdominal pain, diarrhea, or a rash. Many of these symptoms can be mistaken for other diseases. Many different animals carry the bacteria especially raccoons and rodents. People are usually infected through contact with water, food, or soil containing urine from infected animals. The disease is not known to be spread from person to person.

Tuberculosis

Tuberculosis (TB) is a bacterial disease of cervids (deer, elk). It is transmitted by inhaling air contaminated with the bacteria from an infected animal. Animals usually have lesions on the lungs, rib cage, and body organs but lesions may not always be visible. After handling any animal, hands should be washed with soap and water which will remove the bacteria. This practice should always be followed, even if the animal appears healthy. Symptoms include cough, fever, night sweats, fatigue, and weight loss. TB can be treated with antibiotics.

Powassan

Powassan is caused by a virus that is transmitted by woodchuck ticks. Symptoms includes fever, and encephalitis. There is no treatment for Powassan virus. It is fatal in approximately 10% of cases.

GLOSSARY

Acute: happens suddenly

Accipiter: genus and common name of type of a diurnal raptor (the true hawks) that has short rounded wings and long tails, with flight specialized for maneuvering through trees; mostly bird-eaters

Altricial: bird hatched in helpless condition, usually naked, eyes closed, cared for by parents in nest

Anemia: deficiency of red blood cells, characterized by weakness and pale mucus membranes

Anesthetize: produce a local or general insensibility to pain by drugs

Anorexia: lack of appetite

Antiseptics: chemical agents applied to living tissue (such as wounds) to prevent growth of microorganisms

Apnea: cessation of breathing

Aspirate: to inhale fluid into bronchi and lungs

Ataxia: incoordination or lack of controlled movements

Autecology: the natural history of a species, or the ecology of an individual, breeding pair, etc.

Bactericide: chemical agents that kill bacteria

BID: twice daily; every 12 hours

Brancher (slang term): young bird not fully fledged, out of nest and hopping on branches

Brood: birds hatched from single clutch of eggs; also, a verb meaning to provide warmth and shelter for young birds

Bumblefoot: foot abscess sometimes seen in raptors (and other types of birds)

Buteo: genus and common name of a diurnal raptor (also properly called “buzzards” though referred to as hawks in common usage) with long broad wings and short tails, with soaring flight; mostly rodent-and herptile-eaters

Candidiasis: infection by fungi of the genus *Candida*; also known as “thrush”

Carapace: the dorsal shell (top) of a turtle

Carnivore: in some dietary pattern schemes, an animal that eats other animals of any type; in other schemes, an animal that eats terrestrial vertebrates

Carion: dead and decaying animals

Carrying capacity: estimate of the population size of a species that can be supported by a specified area of a fairly stable habitat

Cast: undigested parts of prey (hair, bones, claws, teeth, etc.) eaten by raptors, which are egested (regurgitated) in the form of a pellet [also see "pellet"]; also used as a verb ("cast a pellet")

Cere: fleshy base of upper mandible in some birds (raptors, pigeons)

Cestodes: flatworm parasite; tapeworms are cestodes

Chronic: continuing for a long time

Closed fracture: when the bone at the fracture site has not broken through the skin

Clutch: the eggs laid in a single nesting

CNS: central nervous system

Comminuted fracture: fracture in which the bone is splintered into more than two pieces

Community Ecology: ecological study of groups of species populations

Conspecifics: other individuals of the same species

Coprophagy: ingestion of their own feces; this is normal and necessary in rabbits and some rodents

Crepuscular: animals that are most active around dusk and dawn

Crop: an enlargement of the esophagus in the neck area in some birds; a temporary food-storage area

Cyanotic: bluish/purple color of mucus membranes due to low oxygen levels in the blood

Dehydration: state of deprivation of water

Disinfectants: chemical agents applied to inanimate objects or surfaces to kill disease causing microorganisms; this includes bacteria, fungi and at least some viruses

Dispersal: movement of individual animals from where born to the site of first breeding (not necessarily migration)

Distal: away from the center of the body (e.g., in a distal fracture of the femur, the fracture occurs in section of femur farthest from the hip)

Diurnal: animals that are most active during the daylight hours

Dorsal: pertaining to, or situated on, the back

Ecology: the scientific study of the interactions that determine the distribution and abundance of organisms

Ectoparasite: parasite found on the outside of the body (e.g., fleas, lice)

Edema: swelling or thickening caused by fluid leaking from blood vessels

Emaciated: thin, starved

Endoparasite: internal parasites (most types of worms)

Enteric: pertaining to the intestines or gastrointestinal tract

Epizootic: disease that rapidly spreads and affects many animals (essentially, an epidemic)

Ethology: the study of the behavior of animals

Euthanize: to put to death humanely

Fever: elevation in body temperature due to disease

Fledgling: a baby bird that has matured sufficiently to leave the nest; however, still may not be able to fly

Frugivore: animal that eats primarily fruit

Fungicide: chemical agents that kill fungi

Gavage: force feeding through a flexible tube placed down the esophagus

Germicide: a broad term applied to chemical agents that kill microorganisms

Gestation: time period from conception to birth of young mammals

GI: referring to the gastrointestinal tract through which food passes

Gizzard: muscular portion of stomach in birds; specialized for grinding food

Glottis: opening to the trachea

Granivore: animal that eats primarily grains and hard seeds

Habitat: the native environment of an animal

Hacking: a technique for gradually returning animals to the wild; usually involves making food available to newly-released animal [see also "soft release"]

Hatchling: a newly hatched baby bird (or one no more than a few days old)

HBC: hit by car

Hemorrhage: bleeding (usually refers to profuse bleeding)

Herbivore: in some dietary classification schemes, an animal that eats plants of any kind; in another scheme, a plant-eating animal that feeds primarily on leaves, buds, shoots, grasses, etc.

Herpetology: the study of amphibians and reptiles

Home range: area of general movement and activity of an individual animal; not the same as territory

Hyper: more than normal

Hyperthermia: having an abnormally elevated body temperature, usually from being kept in too warm an environment and not being able to cool itself adequately; not the same as fever

Hypo: less than normal

Hypothermia: having an abnormally low temperature; such animals should be warmed before any food is given

Hypovolemic: abnormally low blood volume

Immature: usually refers to animals that are old enough to be independent of their parents, but not yet old enough to reproduce

Immunosuppression Occurs when T and/or B clones of lymphocytes are depleted in size or suppressed in their reactivity, expansion or differentiation.

Imping: repairing of damaged feathers using undamaged feathers from another bird

Imprinting: process usually occurring early in a bird's life in which the bird learns to identify with and relate to its parental species

Incubation: the action of warming eggs to the temperature necessary for embryo development

Indigenous: originating in, found only in, and characteristic of an area of reference; not the same as native

Insectivore: animal that eats primarily insects

Juvenile: young bird out of the nest and able to care for itself but that has not completed its post-juvenile molt

Kcal (or kilocalorie, or Calorie): an energy unit equivalent to 1000 calories (the "calorie" on most food labels refers to Calories = Kcal)

Keel: the protruding part of a bird's breastbone (sternum) to which the large flight muscles attach

Lagomorph: members of the order *Lagomorpha* (rabbits and hares)

Lateral: denotes a position towards the side of the body

Litter: a group of young mammals born together

Mammalogy: the study of mammals

Marsupial: pouched mammals (kangaroo, opossum, etc.)

Medial: situated towards the midline of the body

Mycoplasmal conjunctivitis (finch eye): A bacterial disease that affects bird's eyes – possibly spread by contaminated food, physical contact with infected birds and/or contact with eye secretions found on feeders.

Nares: nostrils

Native: found naturally (without human intervention) in area of reference; not the same as indigenous

Necropsy: autopsy or post-mortem; an examination of the body after death

Necrosis: death of individual cells or a localized area (decay)

Nematodes: unsegmented worm with cylindrical body, often parasites

Neonate: a newborn

Nestling: a baby bird too young to leave the nest, still dependent on parents, often unable to maintain its body temperature without parents incubating

Nocturnal: animals that are most active at night

Omnivore: an animal that eats both animals and plants

Open fracture: bone at the fracture site has broken through the skin

Ornithology: the study of birds

Parasite: an animal that gains some advantage by living on or in another species

Parenteral: term used for the delivery of medications by routes other than oral; e.g., subcutaneous, intramuscular or intravenous

Paresis: severe weakness or partial paralysis of a limb

Passerine: birds belonging to the Order Passeriformes (literally, "sparrow-shaped"); largest order of birds (more than 5000 species); passerines are also sometimes referred to as "song-birds"

PCV: packed cell volume, volume of red blood cells in blood

Pectoral muscles: one of two sets of major flight muscles in birds, breast muscles

Pellet: roundish mass of bone and fur egested (regurgitated) by raptors [also see "cast"]

Peristalsis: contraction and relaxation of GI muscles forcing food downward

Photoperiod: the proportion of hours of light to hours of darkness in the daily cycle

Piscivore: animal that eats primarily fish

Plastron: the ventral (bottom) shell of a turtle

Plumage: entire feathery covering of a bird

Population ecology: the ecology of a group of individuals of one species living in a specified area

Precocial: birds that leave the nest soon after hatching, usually have strong legs, open eyes and are more responsive to external environment (quail, ducks, killdeer, etc.)

Predator: an organism that kills and eats other organisms

Preening: use of the bill or beak to clean and align feathers

Proventriculus: portion of a bird's stomach that partially digests food before it moves to the gizzard

Proximal: close to the body (e.g., a proximal fracture of the humerus is a fracture of the section of the humerus close to the shoulder)

Rodent: member of the order *Rodentia* (includes rats, mice, squirrels, beavers, porcupines).

QID: four times daily; every six hours

Radiograph: x-ray

Raptor: animal with taloned (raptorial) feet that are used to kill prey

Rehab: a slang term used for anything related to wildlife rehabilitation

Refeeding Syndrome: a clinical condition characterized by electrolyte and mineral imbalances; occurs when nutrients are introduced prematurely to an emaciated patient

Rehydration: the process of restoring body fluids to normal levels

Roost: sleep; also used as a noun to mean location where birds congregate to sleep

Septicemia: invasion of bacteria in the blood stream

Shock: collapse of circulatory function due to severe blood loss, toxins, etc.

SID: once daily; every 24 hours

Soft release: slow, gradual release of animals back into the wild [also see "hacking"]

Sterilization: process of complete destruction of all forms of microbial life

Talons: specialized claws of a raptor

Territory: any area defended by an animal, pair of animals, pack, etc.

Thermoregulate: an animal's ability to maintain its normal body temperature

Thiamine: vitamin B₁ (should be supplemented in birds that are fed dead fish)

TID: three times daily; every eight hours

Trachea: passageway of air to and from lungs for breathing

Trematodes: parasitic flatworm with suckers (synonymous with fluke)

Triage: process of setting medical priorities -- deciding what cases should be treated immediately, later, or not at all (because they cannot be helped)

Trichomoniasis: disease of upper digestive tract of bird caused by the protozoan *Trichomonas gallinae*; also known as "frounce" or "canker"

Tube feeding: same as "gavage"

Uropygial gland: oil gland above the base of the tail in most birds

Vaccination: injection of a preparation of killed or altered microorganisms that is intended to provide immune system protection from an infectious disease or parasite. Modified live vaccines are produced by chemically altering the microorganism so it is no longer capable of producing disease. Because the microorganism is still living, on occasion, some modified live vaccines have produced disease in vaccinated animals. Killed vaccines cannot produce disease, but often may not be as effective at stimulating the immune system.

Ventral: pertaining to the belly or underside

Virucide: chemical agent that kills viruses

Weanling: a young mammal that is of the appropriate age to begin eating solid foods

Zoonoses: diseases of animals that may be transmitted to people

APPENDIX ONE
Wildlife Rehabilitation Organizations

Ontario Wildlife Rehabilitation and Education Network (OWREN)
40-110 Finch Ave W, Suite 1071
Toronto, ON M3J 3M2
Phone: 905-735-9556
Fax: 905-735-6885
Email: owren@email.com

National Wildlife Rehabilitators Association (NWRA)
2625 Clearwater Rd, Suite 110
St. Cloud, Minnesota 56301
Phone (320) 230-9920
Fax (320) 230-3077
Web: <http://www.nwrawildlife.org>
Email: nwra@nwrawildlife.org

International Wildlife Rehabilitation Council (IWRC)
PO Box 8187
San Jose, CA 95155
Ph:408-271-2685
Fax: 408-271-9285
Web: <http://www.iwrc-online.org/>
Email: office@iwrc-online.org

APPENDIX TWO Sources of Information

BASIC REHABILITATION

A large number of up-to-date references to basic texts can be found on the IWRC and NWRA websites. See below for website information.

ADVANCED REHABILITATION AND VETERINARY REFERENCES

Many such texts are available; they tend to be oriented toward particular species or groups of species, and they are often fairly expensive. As a beginning rehabilitator, you may not want or need to purchase them now. As you become more experienced and decide on the species in which you will specialize, you can build your library accordingly.

Altman, R. (1997) *Avian Medicine and Surgery*. ISBN 0-7216-5446-0

Beynon, P. (1996) *BSAVA Manual of Raptors, Pigeons and Waterfowl* ISBN 0-8138-2876-7

Mader, D. (1996) *Reptile Medicine and Surgery*. ISBN 0-7216-5208-5

Williams, E and Barker, I (2001) *Infectious Diseases of Wild Mammals, 3rd ed.* ISBN 0-8138-2556-3

FIELD GUIDES & NATURAL HISTORY

Many field guides are available, some as part of a series offered by a particular organization or publisher. Several examples are listed here.

Alsop, F. (2001). *Smithsonian Handbooks Birds of North America Eastern Region* New York: DK Publishing.

Arent, L. Martell, M. (1996). *Care and Management of Captive Raptors*. The Raptor Center at the University of Minnesota

Baichich, P. (2005). *A Guide to the Nests, Eggs and Nestlings of North American Birds*. Princeton University Press

Banfield, A.

Burt, W. & Peterseon, R. (1998). *A Field Guide to Mammals*. Peterson Field Guide Series. NY: Houghton Mifflin.

Eder, T. (2002) *Mammals of Ontario*. Lone Pine Publishing

Ehrlich, P., Dobkin, D. and Wheye, D. (1988). *The Birder's Handbook: A Field Guide to the Natural History of North American Birds*. NY: Simon and Schuster.

Fisher, C. (1996) *Ontario Birds* Lone Pine Publishing

- Kurta, A. (1995) *Mammals of the Great Lakes Region*. University of Michigan Press
- MacCulloch, R (2002) *The ROM Field Guide to Amphibians and Reptiles of Ontario* McClelland & Stewart
- Martin, A., Zim, H. & Nelson, A. (1951). *American Wildlife and Plants: A Guide to Wildlife Food Habits*. NY: Dover Publications.
- National Audubon Society (1996). *Field Guide to North American Mammals*. NY: Alfred A. Knopf.
- Peterson, R. (2002) *A Field Guide to the Birds of Eastern and Central North America*. Houghton Mifflin
- Sibley, D. (2003). *The Sibley Field Guide to Birds of Eastern North America*. Knopf Canada
- Sibley, D. (2001). *National Audubon Society The Sibley Guide to Bird Life and Behavior*. New York: Alfred A. Knopf.
- Stokes, D. (1987). *Guide to Animal Tracking and Behavior*.

OTHER BOOKS

Hadidian, J., Hodge, G. and Grandy, J. (1997) *Wild Neighbors: The Humane Approach to Living with Wildlife*. Fulcrum Publishing

INTERNET

The **International Wildlife Rehabilitation Council** works to support wildlife and provide resources for wildlife rehabilitators. IWRC is comprised of veterinarians, rehabilitators, conservationists, and other professionals from around the world, all committed to restoring the health, ensuring the welfare, and safeguarding the future of wildlife. <http://www.iwrc-online.org/>

The mission of the **National Wildlife Rehabilitators Association** (NWRA) is to improve and promote the profession of wildlife rehabilitation and its contributions to preserving natural ecosystems. www.nrawildlife.org

The **Wildlife Rehabilitation Professional Mailing List (WLPro)** is a moderated online discussion forum. This list is restricted to professional wildlife rehabilitators and others in related professions, to share information, protocols, and case discussions on the care and release of orphaned, injured, or sick wildlife. <http://groups.yahoo.com/group/wlrehabprofessional/>

The **Canadian Council on Animal Care** is the national organization responsible for setting and maintaining standards for the care and use of animals in research, teaching and testing throughout Canada www.ccac.ca

The **Canadian Cooperative Wildlife Health Centre** is an organization encompassing Canada's four veterinary colleges. Its purpose is to apply the veterinary medical sciences to wildlife conservation and management in Canada. The organization is also dedicated to developing and using knowledge of wildlife health and disease to improve human health and the health of

domestic animals. The CCWHC coordinates Canada's national wildlife health surveillance program and provides educational programs, information, and consultation to both government and non-government agencies, as well as to the public. Please go to <http://wildlife1.usask.ca/ccwhc2003/>

Canadian Food Inspection Agency, Disease Control

<http://www.inspection.gc.ca/english/anima/heasan/disemala/disemalae.shtml>

Canadian Wildlife Service

<http://www.cws-scf.ec.gc.ca>

Wildlife-International is a website containing peer-reviewed information for wildlife professionals. www.wildlife-international.org

U.S. Centres for Disease Control and Prevention www.cdc.gov

U.S. National Wildlife Health Center www.nwhc.usgs.gov

The **College of Veterinarians of Ontario (CVO)** regulates the practice of veterinary medicine in Ontario to protect the public interest. The CVO is not a school or university. The CVO licenses veterinarians, inspects and accredits veterinary facilities and investigates complaints against veterinarians. <http://www.cvo.org/>

American Society of Mammalogists provides access to extensive online information; www.mammalsociety.org

Buteo Books; on-line source for books on birds www.buteobooks.com

Ontario Public Health Units

http://www.health.gov.on.ca/english/public/contact/phu/phuloc_mn.html

APPENDIX THREE MNR Reference Material

Fish and Wildlife Conservation Act (FWCA)

Section 44 of the FWCA governs wildlife rehabilitation in Ontario. The schedules in the back of the Act outline the game wildlife and specially protected wildlife that a wildlife custodian authorization may cover.

You can obtain a copy of the Act at your local MNR district office, or check the E-Laws website at <http://www.e-laws.gov.on.ca> for an always up-to-date version.

Species at Risk in Ontario (SARO)

To obtain a current list of Species at Risk in Ontario please contact your local MNR district office, or go to <http://www.ontarioparks.com/english/sar-link.html>.