Liberty Wildlife Medical Services

Medical Services
Training Program

• Section One •

Introduction to Medical Services
Safety and Wildlife Protocols

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Medical Services Training and You

Thank you for participating in the Medical Services program!

We are fortunate to have a tremendous amount of skill and experience within the Medical Services group. Volunteers in this program have different levels of knowledge and experience that they have brought with them. Just as backgrounds vary from person to person, the learning processes are different, too.

The Medical Services program offers several different ways in which you will be trained: formal instruction including hands-on workshops, self-guided programs, one-on-one mentoring with senior Medical Services staff, and cross-training in other departments.

As training progresses, you may see other volunteers completing procedures that you have not yet been taught. Do not be discouraged. Each volunteer's experience, comfort level, assigned shift, and personal background will affect the progress of his or her training.

The training program is broken down into small, focused workbook units. Each workbook unit will contain study guides, procedures, vocabulary lists, additional reading materials, and often a workshop. A practice workshop will be given on each unit prior to continuing to the next topic.

Remember, this time is for learning. Designate time between training classes to complete your worksheets and study the materials that have been provided. This training period allows you to build the crucial foundation you will need for the future.

Thank you for volunteering. Have fun!

Program Objectives

The Medical Services group at Liberty Wildlife has been developed to provide comprehensive medical support for the sick, injured, or orphaned wildlife that arrive at our facility throughout the year.

This program mirrors other successful volunteer departments in its structure. Each day is divided into four shifts which will provide onsite medical coverage at the facility continuously from 8:00 a.m. through 7:00 p.m.

The Medical Services program was developed for a variety of reasons, some of which are listed below:

The response time for treatment will be equalized.
Onsite medical support during the daylight hours benefits wildlife by having immediate treatment available. Having scheduled shifts of service allows the necessary time for each case to be addressed thoroughly, including completion of all routine treatment and follow-up care, monitoring of general health on outdoor wildlife, accurate paperwork, and computer processing of dispositions.

Expand volunteer expertise.
To involve more individuals in the medical care aspect of the rehabilitation process is a benefit to both the individual and the organization, providing a solid group of experienced volunteers to support Liberty Wildlife on a daily basis.

Other services and needs will be supported.
Having a person at the facility at all times provides an additional resource for emergencies or for other needed work at the facility.

Public access to drop-off wildlife year-round.
Continuous daytime coverage at the facility has proven to be a tremendous convenience for both the person bringing in the animal and for the Hotline volunteer who is coordinating assistance for the community.

Increasing Liberty Wildlife's visibility.
Hundreds of people are introduced to Liberty Wildlife by dropping off an animal. This accessibility provides an identifiable image of "Liberty Wildlife" rather than having the public identify with a clinic or other drop-off point.

Medical Services Staff Responsibilities

Dr. Kathryn Orr, Veterinarian
Liberty Wildlife's founder. Established protocols for standard medical care.

Dr. Stephanie Lamb, Veterinarian
Establishes treatment plans on rehabilitating wildlife. Conducts surgeries and other complex or advanced procedures. Assists with training of new personnel.

Other volunteer veterinarians
There are a few veterinarians that donate their time to help us out as well with surgeries and other advances procedures that you will see in the facility.

Jan Miller, Animal Care Coordinator
Train and mentor new Medical Services volunteers, and perform advanced medical procedures.

Medical Services Staff Volunteers
Experienced Medical Services volunteers have a diverse list of responsibilities that change according to the time of the shift, the day of the week, the volume of animals under treatment at the time, and any special needs at the facility.

Their responsibilities may include:

- Checking in wildlife and conducting initial assessments
- Following treatment protocols and maintaining quality medical care
- Administering medication doses
- Processing paperwork
- Conducting visual wellness checks

Advanced skills and responsibilities may include:

- Dosage calculations
- Applying splints
- Suturing
- Care or treatment of mammals (rabies pre-exposure required)
- Conducting wellness physicals
- Mentoring new volunteers

New Medical Services Volunteers
New volunteers are considered trainees. Initial responsibilities include checking- in wildlife, providing the correct set-up for incoming animals, and processing paperwork. In addition to these duties, the main responsibility of new volunteers is to learn. This includes independent study of the natural histories of active rehabilitating, non-releasable, and educational animals at the facility.

Medical Services Training Schedule

The step-by-step approach of the Medical Services Training Program allows you to build a solid foundation of knowledge and experience as you learn.

Week	Topic
One	Introduction to Medical Services, Safety and Wildlife Protocols
Two	Paperwork and Charting, Handling and Restraint
Three	Avian Skeletal System and Feathers
Four	Assessment
Five	Medications / Dosages
Six	Fluid Therapy
Seven	Wing Bandaging
Eight	Leg Bandaging
Nine	Wounds and Wound Management, Trauma, Disease, and Other Conditions
Ten	Well Care Program Nutrition and Housing

Training Methods

Liberty Wildlife provides care for all native wildlife—birds, mammals, and reptiles. The majority of animals we receive are birds. Although information may be provided on mammals and reptiles, the Medical Services Training Program focuses on avian species.

This program is provided for volunteers that are *actively* volunteering in Medical Services. It provides the core of information critical understanding and following the medical protocols that have been established.

Medical Services training uses four methods: formal instruction including hands- on workshops, one-on-one mentoring, self-guided instruction, on-the-job training during your shift, and cross-training in related departments.

- The formal instruction is provided through a series of classes which review basic information on avian anatomy and structure, common medical conditions, and established treatment protocols for those conditions.

- As new Medical Services volunteers begin their normal shifts, they will work closely with existing Medical Services staff. This close observation and one-on-one mentoring will aid in the development of necessary skills.

- Self-guided instruction provides additional sources of needed information. Journal articles and other reading materials are mandatory components of the program. These articles can be read before or after your shift or at another more convenient time. With the exception of your training materials and manual, all books, reference materials, and articles must stay at Liberty Wildlife unless otherwise indicated.

- Finally, cross-training provides an in-depth understanding of how Medical Services relates to other departments. Cross-training is necessary in the areas of Education, Wildlife Rescue and Transport, Community Information Hotline, Orphan Care, Daily Care, and Administration. Try and become involved in any of these areas to familiarize yourself with them and how the facility runs as a whole.

Training Materials and Communication

Medical Services Reference Guide

The Medical Services Reference Guide is a valuable tool you will use while in training and later in your work as a Medical Services volunteer. This quick reference contains medical protocols that are commonly used at Liberty Wildlife. It is an expanding reference that will be updated as needed.

Journal Entries

A Medical Services journal is used to record the happenings of the shift. Read it! This information is a valuable communication within the department and helps to share exciting and interesting experiences that happen from day to day. Every shift is responsible for writing in the journal. It doesn't have to be long—just write! Date your record and clearly sign your name after each entry.

Medical Services Meetings and Emails

The Medical Services department meets on occasion. These meetings will provide a group forum to discuss interesting cases, new procedures, and meet new volunteers. We mostly communicate through email. This is a great way to stay informed. Please read the emails and respond to them in a timely manner.

Feedback

Your feedback is crucial to the growth and development of the Medical Services department. Please bring all comments and suggestions directly to the Medical Services Program Coordinators rather than to each other. Your questions and comments are valuable check points for the program's success.

Teamwork

Communicate! It will make the difference between a good program and one that is truly outstanding. It is important to maintain a positive attitude within the group at all times. Treat each other with respect. Always remember that it takes the effort of all Liberty Wildlife volunteers to accomplish our goals.

Educate

Help each other. If you feel that someone isn't doing something right, please do not discuss the situation with each other-notify the Program Coordinators instead. Understand that these situations are treated as *education* issues. We are striving to raise the level of expertise of a group of very diverse individuals with varying backgrounds and experience—a task that takes time, patience, and understanding.

Read This Twice!

As you complete your training, please remember that we do understand that there is often more than one way to accomplish a given task. Although you may see more than one solution to a given situation, do not modify the methods you are taught in any way.

Do not vary any treatment plan.
It is our consistency in method and procedure that allows us to work successfully with such a large team of care-givers. Suggestions and feedback are always welcome.

To maintain the quality of medical care as Medical Services grows and changes, consistency within the staff and support for the program and its goals must be of paramount importance.

Your Commitment, And Ours

Medical Services volunteers are assured of a unique and rewarding experience. However, this area requires a tremendous commitment from its volunteers.

Training is mandatory. Even individuals with previous medical backgrounds are required to complete portions of Liberty Wildlife's training program. Some training, by necessity, may be scheduled at times other than your assigned shift. It is crucial that you are able to follow both written and verbal directions accurately. You must be comfortable receiving instruction.

You must be able to work comfortably as a member of a group. The ability to work well with others is crucial. You *must* arrive on time for your shift.

Your shift *cannot* be missed.

Take time right now to evaluate your situation, your team-playing ability, and your personal habits to determine if this demanding position is right for you. Because the responsibilities of this department are so critical, volunteers that cannot meet the needs of the program will be immediately moved to other areas that better suit their interests and skills until such time as their situation changes. The Program Coordinators are responsible for making these decisions.

In exchange for your commitment to this program, Liberty Wildlife is committed to helping you to grow as a volunteer, to provide a means of expanding your knowledge in the field of wildlife rehabilitation, and to offer you this unique opportunity to help Arizona's wildlife in a very rewarding way.

Areas of Responsibility

There are many tasks that are the responsibility of the Medical Services staff.

Medical Care

- Triage or prioritize incoming wildlife
- Assess conditions of incoming wildlife
- Provide continued monitoring of wildlife as indicated
- Move wildlife as needed
- Provide treatment and care for wildlife as indicated

Well Care

- Conduct visual or physical exams on Active Rehabs and Non-Releaseables (outside)
- Conduct visual or physical exams on Education Wildlife (outside)
- Inspect enclosures and aviaries

Work Area

- Clean work area
- Take out trash
- Wash and fold laundry
- Clean inside refrigerator
- Put away medical supplies and donations
- Clean cabinets, drawers, exam areas, and supply bins
- Stock supplies in medical cabinets

Paperwork

- Log incoming animals
- Prepare and update medical and food charts
- Record notes daily in the Medical Service journal
- Record final dispositions

Educate

- Yourself and others
- Listen and Observe

- Continue to read new materials

Liberty Wildlife Facility

- Clean, clean, clean!
- Answer the window
- Perform a daily "walk-through" of the entire facility and act upon what you see
- Aid in other areas of liberty Wildlife as needed

Shift Duties

There will be four shifts to provide constant coverage from 8:00 a.m. to 7:00 p.m.

First shift	8:00 a.m. to 11:00 a.m.
Second shift	10:00 a.m. to 1:00 p.m.
Third shift	1:00 p.m. to 4:00 p.m.
Fourth shift	4:00 p.m. 7:00 p.m.

The first shift is from 8:00 a.m. to 11:00 a.m.

(Fall and winter pick up at clinic and still be at the facility by 8:00am).

- Administer once-daily medications and administer regular morning medications
- Provide morning feedings when specified or needed
- Assess clinic drop-offs and other new arrivals
- Evaluate critical animals
- Clean and stock work areas
- Conduct well care exams on wildlife in outside enclosures
- Use over-lapping one hour at 10:00 a.m. to conduct physicals or other procedures requiring two people
- Assist Daily Care staff with wildlife movement as needed
- Assist other departments and complete special projects as requested
- Complete other duties as assigned or needed

The second shift is from 10:00 a.m. to 1:00 p.m.

The shift is critical for completing wellness checks on recovering animals in the outdoor flights and aviaries as well as exams on non-releasable and educational animals.

- Use over-lapping half hour at 10:00 a.m. to conduct physicals or other procedures requiring two people
- Conduct the majority of well care exams on wildlife in outside enclosures
- Administer mid-day medications
- Clean and stock work areas
- Assist other departments and complete special projects as requested
- Complete other duties as assigned or needed

- During bunny season, this will be the shift that they will be weighed, given fluids, and medicated

The third shift is from 1:00 p.m. to 4:00 p.m.

This shift is critical! Assessments arriving during the afternoon must be processed, treated, and set-up in enclosures. Wellness checks will be completed on rehabilitating animals in the outdoor flights and aviaries as well as on non-releasable and educational animals.

- Conduct the majority of well care exams on wildlife in outside enclosures
- Administer mid-day medications
- Clean and stock work areas
- Assist other departments and complete special projects as requested
- Empty and refill foot baths and clean containers as needed
- Complete other duties as assigned or needed

The fourth shift is from 4:00 p.m. to 7:00 p.m.

The last shift of the day has a heavy medical care load and requires experienced staff. You may sometimes need to stay late if a critical animal is arriving.

- Administer twice-daily medications
- Provide evening feedings
- Conduct well care exams on wildlife in outside enclosures
- Clean and stock work areas
- Assist other departments and complete special projects as requested
- Complete other duties as assigned or needed
- Close and lock-up center

Work Habits

Every Medical Service volunteer is assigned a shift. Learn the responsibilities for your shift. In addition, make sure you follow the important points listed below.

Be on time

If you have been assigned the first shift of the day, you must arrive by 8:00 a.m. – and, yes, this does apply to you! The Hotline volunteers inform the public that they can drop-off wildlife at 8:00 a.m. and people often stop on their way to work in the morning. During the late summer, fall, and winter this means the first shifts must arrive early at the drop-off clinic in order to pick-up wildlife and still be at the facility by 8:00 a.m.

When you arrive, *get started*
Wildlife will arrive constantly during the day. As soon as you arrive, jump in and begin. For example, morning medications must be given early enough in the day so that evening medications are administered with the correct time span in between. No matter what shift you have, if you delay starting your responsibilities, you are causing someone else later to work harder to catch up. Each shift has priorities and getting those out of the way early leaves you for the emergencies and extra duties that always arise.

Plan
Allow yourself enough extra time at the end of your shift. This will always be needed to assess arriving birds and handle other unexpected issues that arise.

Be considerate
Before you leave, take a few minutes to discuss any new cases with the person who is relieving you. If you are in the middle of helping with a procedure, stay until it is completed.

Honestly evaluate your situation
If you are constantly having problems getting a substitute, if you find that your shift is not working for you, or if you find yourself unable to leave when you need to go, let us know. Perhaps timing is not right for you just now. We may be able to switch your day or time slot or, if things cannot be worked out, we can replace you with another volunteer until your schedule changes. Liberty Wildlife must be able to depend on you. Wildlife is depending on us.

Substitutes

Everyone at some point will have a conflict with their scheduled time. Life does have a way of throwing the unexpected at us! There are several things to keep in mind:

Get a substitute - If you have a conflict with your schedule, it is YOUR responsibility to make sure qualified personnel cover your shift. Liberty Wildlife, the animals, your fellow volunteers, and the public are relying on YOU to be there.

Be a substitute - It's a fact that there will be a time when YOU will need a substitute, so try to help when you can. You can always offer to trade with someone rather than substituting outright if needed.

Be courteous - Return all calls about substituting, even if the answer is no.

Start early - As soon as you know you need a substitute, start calling. Call until you speak with someone. Do not rely on messages posted at Liberty Wildlife.

Get creative! - If you cannot locate a substitute, try to have someone trade with you. Maybe two different people can split your shift. One option might be to ask the person before you to stay a little later and ask the person after you to come in a little earlier.

Be prepared - A list of substitutes will be given to you. Keep it on hand so you do not need to call the office for phone numbers. Notify the Program Coordinators of any changes in your availability, address, or phone number.

Send Jan an email - If you cannot find a substitute then email Jan to let her know and she can also send out an email. You also need to please let Han know you will not be in for that shift and who is your substitute.

Vet Day

Each week, Medical Services personnel conduct a formal review of the status and treatment plans on the animals in intensive care at Liberty Wildlife. This activity is called Vet Day. Each case is discussed including the current condition, treatment history, and prognosis. This is a "group-think" activity and learning opportunities abound!

Vet Day tasks are numerous and varied, with volunteers playing the part of a well-oiled machine in order to complete a large amount of work in a reasonable amount of time. Vet Day activities tend to begin whenever there may be a veterinarian available. It is mostly done Tuesday afternoons or Saturdays. There have been occasions when they have started as early as 10 a.m. or started as late as 8:30 p.m. The session may end by 10:00 p.m. or go as late as midnight.

Because of the busy schedules of our Medical Services staff, it is often impossible to predict the timetable in advance, so patience and flexibility are necessary.

After training is completed, new volunteers will be invited to attend Vet Night on a pre-determined schedule that will be posted up on the medical cabinet. Please note: Attendees must be available to stay for the duration of the evening, including clean-up!

Safety

Your first concern while volunteering at Liberty Wildlife should be for your own personal safety. Do not attempt any action unless you are completely comfortable with the procedure and have been thoroughly trained. *Always take measures to protect your health*.

Tetanus Vaccination

Make sure you are protected by a current tetanus vaccination. Contact your personal physician or local health care facility to determine if you are up-to-date. You must have a current tetanus vaccination to volunteer at the Liberty Wildlife facility.

Gloves

Whether you are handling an animal or simply cleaning up after one, gloves are a necessity. Always wear protective gloves when working with animals, their body fluids, or their enclosures.

- Latex gloves should be worn when cleaning cages and preparing food. Use them; they are a great first line of defense. These gloves will also protect other animals from conditions that might be contagious. Vinyl gloves are available for individuals with latex allergies.

- Small, leather work gloves come in handy when dealing with smaller raptors and medium-sized waterfowl.

- Heavy-duty leather gloves are also available. They are at least mid-forearm length and have as few seams as possible. You want the fit to be loose—the idea here is "function over fashion." A tight-fitting pair of gloves can easily be pierced by a talon or tooth. These large leather gloves work well for medium-to-large raptors, such as red-tailed hawks, Harris' hawks, and great horned owls.

- A third type of gloves is made especially for handling larger animals. Similar to the large leather gloves, these are even longer—extending almost to the shoulder—and have a thicker lining. If you are faced with ferruginous hawks or eagles you will be better protected. Even with the thick lining in these gloves it is a good idea to double-glove your palm with a small pair of leather work gloves. Canker gloves are also specified to be used with infected birds.

NOTE: gloves used for wildlife rehabilitation or rescue are dedicated to this purpose and should not be used in situations involving educational wildlife or with your domestic or exotic pets.

Eye Protection

Eye protection is extremely important. Safety glasses or goggles are a must when dealing with animals with sharps beaks or talons. Some waterfowl, such as herons, have long, pointed beaks which they use to stab prey or possible predators with deadly accuracy. The sharp talons on raptors can be a risk too. Don't take a chance with unprotected eyes. Safety glasses and goggles will fit over normal eyeglasses.

Foot Wear
Wear closed-toed shoes when working in the outdoor enclosures.

Masks
Wear an appropriate mask if you have a respiratory condition or are sensitive to respiratory problems. This is particularly important when cleaning or when working with wildlife with contagious respiratory conditions or unknown conditions such as necropsy procedures.

Protective Clothing
You wouldn't go hiking in the desert without sturdy boots, comfortable clothing, and protection from the sun, would you? The same principal applies here! Clothing is important. Wear long pants to protect your legs. Protect your arms and torso, too. Also, it's a good idea to keep an old shirt or coverall in your vehicle to protect your clothing if you take on an unusually dirty project.

Rabies Pre-exposure Vaccine
A current rabies pre-exposure vaccine and the necessary training on mammal handling and restraint are required to work with most mammals. There are no exceptions.

Some important safety points are listed below:
- Do not eat or have open beverages in animal areas
- Wash your hands regularly!
- Do not put markers, pencils, pens, or other objects in your mouth
- Thoroughly clean all work surfaces after medical procedures
- Thoroughly clean all work surfaces at the end of each shift

Lindsey Wildlife Museum

Basic Health and Safety for Wildlife Rehabilitators

Susan Heckly, 1999

Your health and safety should be your first priority when you are working with wildlife whether you rehabilitate at home or in a center. For many rehabilitators, thinking of yourself first is very difficult. Taking the steps needed to protect yourself from injury or illness is not selfish, but rather it is the best way to make sure you are able to continue to rehabilitate wildlife. Health and safety for wildlife rehabilitators are of utmost importance. This cannot be stressed too much.

There are two main areas of concern: injury prevention and infection control.

Safety

The animals we work with can be dangerous. Aside from the obviously dangerous large mammals and raptors, there are many less obvious threats from many other species. Protective gear such as leather gloves, goggles, and/or latex gloves are required for handling some animals and their bedding to prevent injury to yourself or the possibility of disease or parasite spread. Think about how an animal makes its living: is it a raptor that grasps and kills its prey? Is it a squirrel who can gnaw through walnut shells? Is it a great blue heron that spears fish with its bill? You should select protective gear based on what kind of damage an animal could do.

Gloves

Injuries seem to happen more often to the fingers, hands and arms than any other part of the body. Gloves act as a second layer of skin protecting hands from chemicals, biological agents, abrasions, lacerations and punctures. Latex or nitrile gloves can protect against microbial contamination and against some chemicals. Leather gloves can protect against scratches and some bites. Sometimes, however, gloves can give you a false sense of security. For instance, many species of squirrel can bite through the leather gloves right into your finger and great horned owls have been known to puncture leather welding gloves with ease. You will need to balance the need for heavy protective gloves with the need for good manual dexterity. Gloves that are sized correctly for your hand will give you more dexterity than gloves that are several sizes too large. There are specialty gloves: eagle gloves with long gauntlets and more protection, Kevlar gloves that will prevent punctures from mammals.

Goggles

Eyes are a very vulnerable part of your body. You should wear goggles when working with birds with relatively long, pointed bills such as many sea- and shorebirds. Some species such as herons and egrets also have long necks making very real the possibility that a bird could reach your face with its bill even when its body is at a distance. Other times that goggles or other protective eye wear should be worn include when going into an aviary or pen with free-flying birds and when there is a danger that something might be splashed in your face.

Masks

Contaminants and infectious agents such as *Chlamydia psittacii* and feather dander easily become airborne because of the particle size, activity of the animal, and cleaning methods. When inhaled, these can cause infection or lung damage. Masks (more properly called respirators) designed to prevent inhalation of particles should be worn especially when working with birds or their feces. If you are working in an area without heavy dust, any respirator rated for dust or mist should be adequate protection. Surgical masks were developed to prevent the exhalation of particles but their efficacy in preventing inhalation of particles is low and should not be used for protection of your lungs. Make sure the mask you are wearing fits correctly; follow the instructions on the package.

Aprons

Aprons, smocks or other protective clothing can protect your clothes and make it easier to change should you become contaminated with fecal material, blood or other contaminants. You can prevent the spread of disease from animal to animal by changing your protective clothing after working with ill animals.

Scents

When working with mammals, it may be advisable to use only unscented personal care products. These are anecdotal stories of pet mammals reacting badly to certain perfumes. Some perfumes are formulated to smell like musk or other animal products and these scents may trigger a reaction in some mammals.

Clothing/hair

Loose or frayed clothing, dangling ties and scarves, earrings or other loose jewelry, and rings may get tangled in a cage or snagged by an animal. Long hair should be tied back or otherwise controlled for the same reason. Wearing long pants, long sleeves and closed-toed shoes will protect your arms, legs and feet from possible scratches and some bites if you lose control of an animal during handling. Steel-toed shoes may be advisable when moving equipment or cages.

Vaccinations

Everyone working with animals should have a current tetanus shot. Tetanus can result from any scratch, puncture or bite wound that breaks the skin, whether the injury was from an animal or its cage. If working with rabies vector species, you should also have the rabies pre-exposure vaccine.

Hygiene is Important

The simplest precaution you can take is to wash your hands. Even if you take no other precautions to protect yourself, appropriate hand washing will protect you from a myriad of diseases and will prevent the spread of many diseases and parasites from one patient to another.

When to wash

When should you wash your hands? A basic rule of thumb is that when working with wildlife, you can't wash your hands too often. The following are some instances when you should wash your hands:

- Before and after handling any animal
- After cleaning a cage
- After handling dirty laundry
- Before and after feeding baby animals
- Before preparing food for an animal
- Before eating or drinking anything
- Before and after using the rest room
- Before going home

What to use

What soap to use should be based on the degree and type of contamination as well as how germ-free you need to be for your procedure. Do you need to reduce the resident flora in addition to reducing the transient microorganisms you are carrying? In most cases, thorough washing with regular soap and plenty of water will be good enough. Soap works by suspending dirt, microorganisms and other contaminants that then can be flushed off by running water and the friction of rubbing your hands together. The Centers for Disease Control (CDC) is currently recommending that people use plain soap for most general patient care; it is adequate when the purpose of washing is to remove soil and transient organisms. For invasive procedures or when working with immunocompromised or neonatal patients, antimicrobial products can be used. Antimicrobial soaps work mechanically to flush away contaminants as well as chemically to reduce or kill microorganisms present. Some antimicrobial soaps have a residual effect, remaining active for a period of time after you have washed your hands. There are many antimicrobial soap on the market. You should work with your veterinarian to determine which product would be best for your situation.

How to wash

How you wash your hands may be as important as when you wash them and with what product. Basic hand washing techniques:

- Wet your hands with water.
- Lather your hands with enough soap to produce lather and a slippery surface.
- Vigorously rub together all surfaces for at least 15 to 20 seconds
    - More time may be necessary for particularly soiled hands or with a slow-acting antimicrobial soap.
- Pay special attention to the area around your fingernails or rings where microorganisms may adhere.
- Rinse thoroughly under running water.
- Dry with a paper towel. Use the paper towel to turn off the water faucet so you don't re-contaminate yourself.

* If you are using an antimicrobial soap, follow the directions from the manufacturer. Some soap must remain in contact with your skin for a longer time.

Even better protection for your hands than washing is wearing protective gloves, such as disposable latex or nitrile gloves. You can wash your gloves just as you would wash your hands between animals unless you use new gloves for each animal or activity. In fact, latex gloves are easier to wash than your hands because your hands have cracks, crevices and fingernails for germs to hide in. An important caveat with gloves, however, is that gloves can easily develop holes that allow contaminants to enter and the moist environment between your skin and the glove is ideal for microbial growth. Wash your hands before and after wearing gloves.

Zoonosis

People always ask, “Can I catch anything from these animals?” The answer is “Yes.” This is referred to as zoonosis or disease of animals that is transmissible to humans.

Zoonosis is definitely a concern to wildlife rehabilitators. Keep your personal physician advised of the work you do so that if you are ever ill they will know to consider zoonotic conditions. If you visit a physician that is not aware of your history be sure and inform them of the possibility of zoonotic diseases.

Read this section carefully. It contains articles on zoonosis and zoonotic diseases from several different sources.

For example, you will read about rabies, a deadly virus. A current rabies pre-exposure vaccine—necessary training on mammal handling and restraint—and authorization from the Medical Services Program Coordinators are required to work with mammals. There are no exceptions. Always take precautions to avoid transmission of any of these diseases. Follow the proper safety procedures at all times.

Zoonoses: What You Don't Know Can Hurt You

By Linda Wolf, DVM
White Bear Lake, MN

When you first begin to drive a car, you don't just take the keys get into the vehicle, and go sixty-five miles an hour down the freeway. Driving has inherent dangers to both you and the others on the road. Without being given the proper instruction on defensive driving, the risks of injury are obviously increased. In driving, it makes a lot more sense to learn to prevent accidents from happening than to try to repair the injuries after they happen.

As a wildlife rehabilitator, you are automatically placed in a segment of the populations that is high risk of experiencing a zoonotic disease. A zoonosis, (plural – zoonoses), is an infection or infestation shared in nature by man acquired (transmitted) from an infected animal to man. In order to decrease the chanced of acquiring a zoonotic disease, wildlife rehabilitators should know the essential factors that enable a disease to pass to man, gain knowledge of the zoonotic diseases, and be constantly aware of the preventative measures that must be taken to break the passage of the disease from animal to man.

Essential Factors for Disease Transmission

There are six essential factors that need to be present for transmission of a disease. These include:

1. a causative agent
2. a reservoir of the infectious agent
3. a portal of exit
4. transmission of that agent from the reservoir to the new host
5. entry of the organism from reservoir to the new host
6. a susceptible host

First, there must be a causative agent. This is the bacteria, virus, parasite, etc. that causes the disease. It is important to know what zoonotic diseases are prevalent in the animals to which you are exposed in the area where you reside. This knowledge is especially important in case where a rehabilitator experiences an illness and may have to inform his or her physician of zoonotic disease possibilities.

Second, there must be a reservoir. This is the natural habitat of the disease agent or its main residence in nature. The reservoir can be animate (i.e. skunk can be a reservoir for rabies) or it can be inanimate (i.e., wet straw can be a reservoir for aspergillosis). Although it seems apparent that the best way to prevent zoonotic disease is to avoid the reservoirs, this obviously would be

counterproductive to wildlife rehabilitation, since almost every species with which we deal has the potential of being a reservoir.

Third, there must be an exit portal. This is the route by which an agent escapes form a live reservoir host. This can be a normal routed (respiratory, gastrointestinal secretions, urogenital), or abnormal (lesions).

Fourth, there must be a way for the causative agent to transfer from the reservoir to the host. This is its route of transmission. Transmission can be direct, (contact, injection, inhalation, ingestion), or indirect, (needs an agent for survival outside the host). Indirect transmission is by a vehicle or a vector. A vehicle is an inanimate object, (soil, air, water, etc.). A vector is an animate object which can be mechanical; (where the agent is just carried without changing form,), or it can be biological (where the agent undergoes a change during transmission). The method of transmission is perhaps the most important information to know if order to present disease spread. For example, if you know that a parasite is transferred to many by ingestion (e.g. roundworm eggs in the feces, then the way to prevent zoonotic roundworm infection would be by not ingesting feces.

The fifth factor is the entry of the organism into the new host, which is called the portal of entry. Types of entry portals include respiration (e.g. breathing in aspergillosis), ingestion, (swallowing roundworm eggs via fecal ingestion – we hope no one would intentionally do this but it is easily done unintentionally), lesions (e.g. saliva containing rabies virus via a cut in the skin). This is another area where preventative measures can make a tremendous difference.

Last, there must be a susceptible host. In this area, the way we can decrease our chances of disease is to increase our personal resistance. Here are primary resistance factors and secondary resistance factors. Some primary resistance factors include species type (here we really have no say in the after, intact skin (keeping the skin surface healthy and unbroken) and acquired immunity (vaccinations). Secondary resistance factors can include pathologic states, nutritional states, physiologic adaptations, sex, age, and occupation. As wildlife rehabilitators, we tend to ignore our own health and allow our resistance factors to fall. Most of us freely admit that the animals for which we care probably get better nutrition and care than we give ourselves, especially in the busy season.

It is almost impossible to have a thorough knowledge of every zoonotic disease. However, knowing the primary causative agents that you are likely to encounter (which animals are likely to be the carriers, and how he disease in transmitted), will increase our ability to interrupt the transmission of the disease and to safeguard yourself as much as possible from zoonoses.

Etiological Agents

The book *Zoonoses and Communicable Diseases Common to Man and Animal* by Pedro N. Acha and Boris Szyfres lists over two hundred causative agents in zoonotic disease. Obviously, it is not possible to cover every etiological agent (any living or nonliving thing capable of causing a disease), in this article. Some of the more common agents in each category will be discussed. It is not as important that you know the exact agent as it is to start to understand the relationship between the agent and how it transfers to the new host (in this case as the wildlife rehabilitator). It is in this way that you will be able to assess the measures necessary to prevent the disease transmission. You will also notice that many of the clinical signs of these diseases in people can present with flu- like symptoms. This is where it becomes important to realize if there is a risk of exposure to a specific zoonotic disease and be able to inform your physician of any possibilities.

Bacterioses *(Leptospirosis)*

This disease is caused by more than one hundred eighty known varieties of the spirochere bacterium *Leptospira* interogans. Its distribution is worldwide and it affects a wide variety of rodents and other wild animals. The causative agent (leptospires), are shed in the urine contaminating the environment. Bite transmission has been reported but is most likely occurred from urine contaminating the bite wound.

The disease in man normally has an incubation period of primarily one to two weeks, and the classic signs include sudden fever, headache, nausea, vomiting, diarrhea, and/or constipation.

Control measures include personal hygiene, protective clothes, and rodent proof structures.

Lyme Disease

The agent involved in Lyme disease is another spirochete, *Borrelia burgdorferi*. Once only of a concern on the east coast, its distribution has spread throughout the northeast, Midwest, pacific, and southern regions. Some of the reservoirs include white-tailed deer, white-footed mice, raccoons, and squirrels. Transmission is indirect by vector. The most common vector is the tick *Ixodes* dammini prevalent in the northeast and Midwest, *Ixodes pacificus* on the west coast and *ixodes scapularis* in the south and southwest. Research is also being done to verify whether the common "dog tick" *Dermacentor variabilis* has the ability of transference of *Borrelia*.

The clinical disease in man can vary tremendously. A classic (but not always present) early symptom is a characteristic skin rash called erythema chronicum migrans. This is a red circular patch varying in shape and size that appears usually three days to one month after the bite of an infected tick at the site of the bites. Some symptoms and signs may not appear until weeks, months or years after an infected tick bite: arthritis (especially in the knees,) nervous systems abnormalities, pain, facial, nerve, paralysis fever, stiff neck, and severe headaches, and irregularities of the heart rhythm.

Control measures consist of avoiding endemic areas and tick bites. Use of protective footwear, clothes, repellents, and control of ticks and fleas in the rehabilitation area and on the animal are imperative.

Salmonellosis

This is bacteria with over three hundred serotypes and has a worldwide distribution. Its primary reservoir of concern in wildlife has usually been rodents and cold-blooded animals (turtles). The transmission of bacteria is normally by consuming contaminated food or ingestion via a contaminated environment. This is often a fecal – oral route.

Perhaps the most widespread zoonosis in the world, the disease in man is characterized by a six to seventy-two-hour incubation period after ingestion of infected material. Clinical signs of the disease in man include abdominal pain, nausea, vomiting, and diarrhea. Although the course of the disease is usually benign and clinical recuperation starts in about two to four days, dehydration can be serious. Personal hygiene and protective clothing (especially gloves) are the best preventative measures.

Mycoses *(Aspergillosis)*

Aspergillosis is caused by the fungus *Aspergillus fumigatus* and related organisms. It is ubiquitous in a wide variety of birds and mammals. It is particularly common in waterfowl and other aquatic birds, casing trauma to the respiratory system. The transmission occurs when an infected animal contaminates the environment. Aspergillus organisms will grow in or on a variety of organic matter including decaying vegetation. The primary route of infection is by inhalation of airborne spores from the environment.

Man has natural resistance to this organism. Germination of the spores in the human system can more readily occur when there are exceedingly numbers of atmospheric spores in the environment or when the person is debilitated, immunosuppressed, or on prolonged drug treatment. Respiratory symptoms are the most common clinical sign.

Control measures include maintaining good ventilation, avoiding overcrowding of animals, and keeping the environment clean and dry. Masks can be used to aggressively decrease the chance of exposure.

Dermatophytosis *(Ringworm)*

Several species of *Microsporum* and *Trichophyton* are primary causative agents. Dermatophytes, once considered to be imperfect fungi, are now classified as Ascomycetes. Distribution is worldwide and the main reservoirs are rodents, canines, and felines. Transmission is by direct contact with an infected animal or indirectly by contact with spores on the infected hairs of the dermal (skin) scales that are shed by an infected animal.

The disease in man is superficial infection on the keratinized parts of the body (skin, hair, and nails). Signs include inflammation and irritation. Often the lesions tend to be annular and the borders are reddish and sometimes raised. Avoid contact with infected animals in the obvious control method. However, since we must work with and treat infected animals, the first thing that must be done is to control the infection in the animal and to avoid direct contact by using protective clothing and gloves.

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Chlamydioses *(Chlamydiosis)*

This disease, often referred to as Psittacosis or Ornithosis, is caused by the agent *Chlamydia psittaci* (transmitted from birds and mammals to man): It is important to note that this is not agent C. *trachomatic* (the human to human pathogen). With worldwide distribution the primary reservoirs we deal with are pigeons, ducks and psittacines. Transmission occurs by inhaling the airborne agent in a contaminated environment.

Chlamydiosis has an incubation period usually of one to two weeks. Mild forms of chlamydiosis are often confused with common respiratory illness and can often go undiagnosed. Clinical signs can include sudden onset of fever, chills, sweating, aches, loss of appetite and headaches. Some cases produce pneumonia-like symptoms. Since early treatment is important in shortening the illness and reducing symptoms. It is important to inform your physician of the likelihood of exposure.

Control measure includes masks, protective clothing, proper ventilation and thorough area disinfecting.

Viruses

Rabies

One of the oldest of reported diseases, rabies is of major concern in the field of wildlife rehabilitation. The rabies virus is a rhabdovirus: Although it can be quickly inactivated by sunlight, drying, and common chemical disinfectants, it is not a disease to be treated without extreme respect. Even though our major reservoir focus has been on species such as foxes, skunks, raccoons, bats, and coyotes, all warm-blooded animals should be considered to have the capability of being reservoirs. Certain species (opossum, birds) are thought to be too resistant to be of major import. Others (rodents, lagomorphs, deer) are rarely infected. This is possibly a result of their specific habits, size, or resistance factors. Transmission most often occurs when the virus in the saliva of an infected animal comes in contact with nerve tissues of susceptible host, via a bite. However, transmission by airborne passage (in bat caves), and by an owl (thought to have occurred by an owl who caught rabies via an infected animal and had blood on its talons), has been noted.

In animals, the primary clinical picture is one of abnormal behavior or altered disposition and progressive paresis. Often loss of fear, aggressiveness, and “friendliness” or in coordination can be observed. However, in wildlife, there is not an exact duration of onset from infection and many may be carriers of the virus for extended periods of time without any clinical signs being present.

Rabies is of extreme importance in human public health. It carries a high mortality rate, (one hundred percent), substantial mental and emotional impact and economic loss. In man, the incubation period is normally two to eight weeks, but there have been cases where the incubation

was from ten days to over a year. The disease usually begins with a feeling of anxiety, small increase in body temperature, malaise, and sensory changes. An excitation phase follows, with sensitivity to light and sounds, dilation of the pupils and an increase of salivation. Muscle spasms, swallowing dysfunction, generalized convulsions, and paralysis are often signs preceding death.

Prevention is of utmost importance. Avoiding contact with the rabies virus is the obvious best means to prevention. The knowledge of proper restraint techniques, preventive clothing (gloves etc.), and recognition of problem species and conscious acknowledgement of the seriousness off the problem are extremely important in rabies prevention. Prophylaxis with pre-exposure rabies vaccination should be considered highly desirable if not mandatory for dealing with high-risk animals. Pre-exposure vaccinations are not without potential risks Especially in people who are immunosuppressed or compromised, pregnant or in diseased state) so the procedure should always be discussed with a knowledgeable physician. If a person does become exposes, they should be allowed to bleed and then scrubbed thoroughly. The animals should be identified, submitted for antibody testing, and a physician should be consulted. Contrary to reports being distributed in some areas, there are no established quarantine time for wildlife.

Hantavirus

Hantavirus was identified as the cause of a mysterious disease outbreak in the southwestern United States affecting a number of Navajo Native Americans. The area has since grown, and in 1993 there were fifty-three cases reported in fourteen states. Rodents are the reservoir with the primary host believed to be the deer mouse and the vole. The virus is transmitted via their saliva, urine and feces. Exposure is most likely to occur when dried materials contaminated with rodent excreta are disturbed and inhaled as dust particles, directly into broken skin, by ingesting contaminated food or water, or by a bite.

Prevention can best be accomplished by reducing the rodent's population, thereby reducing the amount of contaminated materials present. This can be accomplished by keeping food and garbage covered and stored in rodent proof containers, and by eliminating rodents in your centers. Other protective measures include using protective gloves and masks when cleaning contaminated areas or when handling species at risk.

Parasites *(Visceral Larva Migrans)*

The most infamous larva migrans agent in wild life rehabilitation has become the common large roundworm parasite in raccoons, *Baylisascaris procyonis*. However, it is important to realize that other carnivore ascarids can cause this same condition. *Baylisascaris procyonis, Toxacara canis* (dogs and wild canids), *Toxacara cati* (cats and wild felids), and *Baylisascaris columnaris* (skunks) are some examples of ascarids that are capable of infiltrating the human system and causing damage. Human beings become infected by accidentally ingesting infective eggs from raccoon, (fox skink, dog, cat, etc.) feces, contaminated soil, water, fomites, or via contaminated hands. The ingested eggs hatch and become larvae that penetrate the mucus and migrate via the liver to various body organs.

The clinical signs in man are caused by the migration of large numbers of larvae through various body tissues and the resultant physical changes. Clinical manifestations depend on the infective species, the number of larvae, the route of migration, and anatomic location affected. A low number of larvae may present with non-specific or no signs, whereas a high number of larvae may show ocular (eye) problems, central nervous system disease, liver and/or lung damage.

Prevention seems rather simple in this case: do not ingest feces. However, it is complicated by the fact that ascarids nematode eggs are extremely resistant. Primary control measure to decreases the risk of contamination consists of routine fecal testing and worming procedures, prompt removal and proper disposed of feces, glove and mask use, strict personal hygiene and elimination of human personnel food and drink consumption in work areas.

Hydatidosis *(Echinococcosis, Hydatid Disease)*

Alveolar hydatid disease is an infection with the larval form of the *Echinococcus multilocularis* parasite, a species of tapeworm found in wild canids. Once confined to the Alaska coast and sparsely populated areas of the North Central states, it has now been identified in the Dakotas, the Central Plains, the Midwest, and as far south as the Carolinas. Natural reservoirs include the fox, coyote or various rodents. Transmission is via accidental ingestion of infective *E. multilocularis* eggs passed in feces.

In humans, these eggs hatch and travel into the hepatic portal system (liver), where they can produce parasite tumors. These cysts can expand to surrounding tissue. Clinical signs resembling liver cancer and cirrhosis usually do not appear until the hydatid cyst has continued for several years and the damage has become extensive.

Prevention is accomplished by using precaution through personal protection and careful hygiene to avoid hand to mouth transfer of eggs. Routine fecal exams and worming of all animals should be done to reduce the likelihood of area contamination as well as prompt removal and disposal of fecal matter.

Sarcoptes *(Zoonotic Scabies: Sarcotic Mange)*

The agent of human scabies is the mite *Sarcoptes scabiei. Notoedres cati*, the agent of head scabies in cats, occasionally causes temporary dermatitis in humans. Each animal species is a reservoir of the mite that attacks its own kind, but cross transmission occurs occasionally between species. One of the main sources of zoonotic scabies is the canine family. The mite transmitted by close contact with animals and contaminated objects.

In man, the disease presents itself by skin irritation and pruritis. If the disease is caused by animal mites, it is usually benign and the infection is superficial with possible lesions and vesicles. An intense allergic sensitization with the appearance of vesicles can also occur. Excoriations are frequent. In humans infected with animal *S. scabiei* the parasites either do not reproduce at all or do so only for a short time, thus the infection often heals by itself within three weeks.

The best control is to treat affected animals and clean the environment. Protective clothing, including glove use, is highly effective.

Prevention

As stated previously, is not possible in this article to list all the zoonoses that exist. What is important is for the wildlife rehabilitators to be aware of the potential zoonotic disease they may encounter, to know the way that transmission occurs, and to be constantly aware of the preventative measures that can be taken to reduce the likelihood of exposure.

Prevention means inhibiting the introduction of disease into an area, herd or individual. When dealing with infectious diseases, the essential object is to prevent contact between the causative agent and the susceptible host. One way this could be done is to isolate the susceptible host. There are three main areas on which to focus.

1. **Neutralize the reservoir**. This can be accomplished by methods such as proper waste control, conscientious use of insecticides, and proper disinfection methods.
2. **Decrease the contact potential**. Methods include providing adequate ventilation, use of gloves, masks, and other protective clothing, employing proper hygiene.
3. **Increase host resistance**. Vaccinations of high-risk groups, proper wound treatment, better nutrition, and on overall better health status are all areas that will help decrease the chance of infection.

This article was not meant to scare you away from wildlife rehabilitation. Hopefully, it has made you aware that, with properly trained personnel following proper methods and procedures, wildlife rehabilitation efforts can be done safely as well as efficiently.

The following is an introduction to some of the more common Zoonotic Diseases. It is by no means a complete list.

Zoonotic Diseases

Zoonotic diseases are those diseases that can be transmitted from animals to humans. These diseases are of particular interest to wildlife rehabilitators because of the close contract we have with a large number of wildlife species. Your main concern with these diseases should be how to protect yourself. If you do become ill after handling animals, make sure you mention your contact with wildlife when you visit your physician.

Aspergillosis - Aspergillosis is caused by a fungus *(Aspergillus fumigatus*) that is ubiquitous to our environment. It is an opportunistic disease that flourishes when an animal is under stress, such as in captivity. It is common in raptors and waterfowl. Birds should be housed in areas with good ventilation. Straw should never be used in birds' housing; the fungus can thrive in it when wet. Moldy grains and food can also harbor the fungus. Birds with this disease shed the virus when they exhale, but most healthy people have no trouble resisting the infection. Wearing masks will decreases the risk of exposure. Anyone with a compromised immune system, debilitated by illness or long-term antibiotic therapy needs to take extra precautions to reduce the chance of infection.

Raccoon roundworm - *Baylisascaris procyonis*, a roundworm, is carried by raccoons. Up to a million eggs are shed daily in their feces and can infect other animals and humans if the eggs are ingested. The larva of the roundworm migrates though body tissues, causing damage to the eyes; brain or other tissue and can cause death. Rehabilitators should take extra care when working with raccoons. Always wear gloves when handling feces, food dishes and bedding, and when cleaning their cages. Consider deworming raccoons while they are under your care for the safety of the caregivers.

Hantavirus - Hantavirus was recently identified as the cause of illness when there was an outbreak in the southwestern United States. Rodents are the main reservoir of the disease. While the deer mouse is identified as being the primary host, other rodents have been shown to be carriers. Exposure to the virus is most likely to occur when dried urine and fecal material is disturbed and inhaled as dust particles. Other routes of transmission are through broken skin, a bite from an infected animal or ingestion of contaminated food or water. To prevent Hantavirus infection when caring for wild rodents, use protective gear (masks and gloves) and use wet cleaning methods to avoid aerosolizing the potentially infective particles. Reducing rodent populations around dwellings and animal care facilities will also reduce the risk of infection.

Echinococcosis - Echinococcosis, or hydatid disease is infection with the larval stage of tapeworms belonging the genus *Echinococcus*. Cysts can develop in the liver, spleen, nervous tissue or bone. The route of infection is from ingesting the eggs of the tapeworm, usually by hand to mouth after contact with an infected animal (most commonly canids), but also from substances contaminated by infected feces. Flies can also disperse the tapeworm eggs after they feed on infected feces. *Echinococcus granulosus* is the most common and widespread species. A hydatid cyst enlarges slowly but may rupture causing shock and may cause secondary cysts to develop. The wild animal hosts include foxes, coyotes, deer mice and voles. Rehabilitators should take extra care when working with these species. Always wear gloves when handling feces, food dishes and bedding, and when cleaning their cages.

Leptospirosis - Leptospirosis can affect most species of warm-blooded animals. Because the infective organisms survive in water for extended periods, transmission is often waterborne. Infection is commonly acquired by contact of skin or mucous membrane with urine or by ingesting urine contaminated feed or water. Wild animals that commonly carry this disease include opossums, rodents (especially roof rats) and feral cats, but can also be found in foxes and was diagnosed in black tailed deer fawns in 1998. The common symptoms in humans are fever, headaches, rash, myalgia, and malaise. Prevention should center on personal hygiene and protective clothing.

Rabies - Rabies is caused by a virus. All mammals can transmit the disease, but it is rare in rodents, lagomorphs and opossums. This is a fatal disease with no cure. Symptoms include neurological symptoms, disposition changes, salivation, and voice changes. In wildlife species there is not a well-defined incubation period and many animals may be carriers of the virus for an extended time before showing symptoms. The virus is present in saliva, so bites are the most common mode of transmission, but any breaks in your skin can also allow the virus to enter. The best way to avoid contracting rabies is to avoid contact with the virus through use of

protective clothing and proper restraint techniques. Anyone working with rabies vector species should receive a pre-exposure rabies vaccination series and follow that up with a booster or a titer check every two years. If a person is exposed to the virus (even one with pre-exposure vaccine), the animal should be submitted for antibody testing and post exposure vaccine given.

Plague - Plague, found in the Western part of Canada, United States and Mexico, is an infectious disease caused by a bacterium (*Yersinia pestis*). Animal hosts include any mammal that has fleas, most commonly rodents and lagomorphs. Plague is transmitted by infected fleas or a bite from an infected animal. All wild mammals should be checked and treated for fleas before further care. The incubation period is 2-6 days; initial symptoms include fever, chills, muscle aches, a feeling of weakness and swollen and tender lymph nodes. Plague is curable when diagnosed early.

Lyme disease - Lyme disease is caused by a spirochete, *Borrelia burgdorferi*. Transmission is through a tick bite; several species of ticks can be infective. It is carried by a wide range of wild mammals, but primarily deer, mice, wood rats, raccoons, and squirrels. All wild mammals should be checked and treated for ticks before further care. The incubation period and symptoms are variable. A classic, early symptom is bulls-eye rash at the bite location (but not always present), and later arthritis and neurological abnormalities.

Salmonellosis - Salmonellosis is caused by bacteria that can be carried by most animals including, mammals, birds, reptiles, amphibians and fish. Transmission to humans is by a fecal-oral route when food or water is contaminated by droppings. Protective clothing (gloves) and attention to hygiene are the best preventative measures. At the very least, wash your hands after handling any animal. Incubation is 6-72 hours; clinical signs include abdominal pain, diarrhea, vomiting and fever.

Chlamydiosis - Ornithosis (also called psittacosis or Ornithosis) is caused by a bacterium (*Chlamydia psittaci*) carried by a wide range of birds including psittacines, pigeons, raptors, and ducks. One main route of transmission is by inhaling dried feces that become airborne. It is important to avoid build-up of feces by regular (daily) cleaning of birdcages and aviaries. Wearing masks and protective clothing, proper ventilation and frequent disinfection are good preventative measure incubation in humans is 4- 15 days; symptoms include fever, chills, headaches, a dry unproductive cough and pneumonia.

Tularemia - Tularemia (also called rabbit fever) affects a large number of vertebrate and invertebrate species. It is transmitted by direct and indirect means, including through tick bites, scratches and contaminated fluids splashed on mucous membranes. The North American wild mammals most often associated with tularemia infection in humans are wild rabbits, hares, beavers, muskrats, and voles. Symptoms begin with a lesion at the site of entry of the bacteria, followed by fever, chills, muscular pains, headaches and vomiting.

CONCLUSION

Personal health and safety do matter for all wildlife rehabilitators. Wildlife rehabilitators need to be as progressive in protecting ourselves as we are in providing the best care to the wildlife entrusted to us.

The most important thing to remember is to use common sense and don't take shortcuts around safety. If you do not feel comfortable doing something, trust your intuition. Get help from someone else or find another way to do the task so you can do it safely. We need to make sure we will be able to rehabilitate wildlife tomorrow.

REFERENCES

ACHA, Pedro N; and Szyfres, Boris. 1980. *Zoonoses and Communicable Diseases Common to Man and Animals*. Pan American Health Organization. "California Compendium of Psittacosis Control." California Department of Health Services.

CHEN, Shu-Kang, MPH; Vesley, Donald, Ph.D.; Brosseau, ScD; and Vincint, James H., Ph.D., D.Sc.. 1994. "Evaluation of single-use masks and respirators for protection of health care workers against mycobacrerial aerosols." *Am. J of Infection Control*, 2nd Edition.

FOWLER, Murray, DVM, ed. 1986. *Zoo and Wild Animal Medicine*, 2nd edition.

GARNER, J.S. Favero, M.S. CDC Guidelines for the prevention and control of nosocomial infections American Journal of Infection Control

LARSON, F. 1989. "Hand washing: It's essential – even when you where gloves." *Am. J. of Nursing*. 89:934-939 American Journal of Nursing *Zoonosis Updates*: 1995. From the Journal of American Veterinary Medical Association

Rabies in Wildlife

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Rabies is a zoonotic viral disease, which has been recorded for over 4,000 years. Even today, in some parts of the world rabies is responsible for thousands of human deaths annually. In the U.S. there are on average two deaths per year, however millions of dollars are spent annually on post-exposure treatment.

While domestic dogs used to be the principal rabies vector in this country, today various wild species in different parts of the country are much more commonly affected. The domestic cat has replaced the dog as the most commonly affected domestic specie, but over 80% of rabies cases occur in wildlife. Since wildlife rehabilitators may come in contact with rabid or potentially rabid species and are often called upon by private citizens for advice in this area. It is important that they understand this disease.

Unfortunately, there is a lot of misinformation, confusion, and gaps in our scientific knowledge, which can create uncomfortable situations when dealing with this problem.

While all mammals are susceptible to this disease the four most commonly affected species in the country are the raccoon, skunk, bat, and red fox. This virus commonly found in these species can be differentiated by special laboratory techniques and does behave differently in each specie. The disease, rabies, has never been diagnosed in birds or reptiles, and these animals are not considered to play a role in its transmission. The skunk was the principal rabies vector until 1991 when it was replaced by the raccoon.

The skunk is found throughout the country and in the primary vector of rabies in the Midwest and the West. Fox rabies is the least common of the four typ0es in this country, primarily seen in the Northeast. The red fox is the specie most frequently affected and it is an important rabies vector in Europe. Bat rabies is ubiquitous and has been determined to be the cause in the majority of the recent human cases in the U.S., although a history of exposure was not always determined. The big concern currently is with the epizootic of raccoon rabies in the Middle Atlantic states which has spread into New York, New Jersey, and New England. The extension of this epizootic is largely responsible for the 43 % increase in the number of reported cases of animal rabies in the U.S. from 1990 (4,881) to 1991 (6,975). Because this area is so densely populated there is a greater risk of contact between affected species and domestic pets and their owners.

The best news about rabies is that it is a relatively difficult disease to contract. The probability of a person contracting rabies from an animal with confirmed rabies varies from less than 1 percent for contamination of minor wounds to more than 80 percent for severe bites by wolves. The bad news is that the disease is 100% fatal in an un-treated person. There is some evidence to suggest that wild species may become immune to the natural infection.

One of the common questions concerning rabies involves exposure. Exposure to rabies is defined as an animal bite, scratch or contamination of mucus membranes or un-intact skin by saliva or nervous tissue. The virus is most commonly spread in the saliva as the result of an animal bite. Public health laboratories may be reluctant to test a suspect animal unless there has been human exposure due to the cost involved.

Rabies may also be spread across the placenta or through the mammary gland. In this way immature animals will become infected. These animals may be presented to rehabilitators as orphans and subsequently exhibit clinical signs. Such a case recently occurred in a five-month-old raccoon being raised in Virginia Beach, Virginia. There is a definite risk involved hand raising high risk species in the midst of an epizootic.

One of the principal areas of confusion about this disease concerns its incubation period, the time period between when the virus enters the animal and when signs of disease are produced. The incubation period varies from 9 days to greater than one year depending on the virus strain, host species, dosage and the site of inoculation. An infected animal is usually not shedding the virus until late in the course of the disease. However, bats may shed the virus for weeks without ever showing signs of illness. Thus, the quarantine and observation of wild rabies suspects is not very effective and is only practiced with domestic dogs and cats where we know that if they are shedding the virus they will show clinical signs within 10 days.

Adding to the confusion about this disease is the variety of clinical signs seen. In “furious” rabies aggression in the most notable sign. Affected animals will attack on-prey species such as humans, pets, and livestock. In the “dumb” form the animal will be lethargic often exhibition a staring expression and may look like a sick animal with any number of different diseases. Paralysis and convulsions can be seen in either form of the disease. Canine distemper infection in foxes, skunks, and raccoons can closely resemble rabies. Rabid animals may be presented due to injuries caused by automobiles or other animals. Although rabies is commonly seen in the aforementioned species it has been reported in such diverse species as squirrels, groundhogs, beaver, white tailed deer, opossum, otter bobcats, and coyotes among others. This “spillover” into other species is especially common during epizootics. Any wild mammal, which is not acting normal or is exhibiting other representative clinical signs, should be considered a rabies suspect until proven otherwise. This is particularly important when advising citizens over the telephone and when handling these animals in rehabilitation setting.

It is essential that people working with wild mammals obtain pre-exposure rabies vaccinations. They should seek advice from their local or state public health department concerning vaccinations, boosters, and the monitoring of their titers.

The most accurate method to diagnose rabies in an animal is immunofluorescent antibody (IFA) testing of brain tissue. This is a rapid test which usually performed by public health laboratories. It is best if the brain is fresh or cooled, not frozen. This test cannot be performed if the brain has been formalinized. Another procedure which may be done is to look for Negri bodies, but they are only present in 75 to 80 % of infected brains. A mouse inoculation test is run if there has been human exposure and the IFA test is negative. The results of this test take up to 3 weeks. All of the above tests are run on brain tissue from the dead animal. There are some IFA tests which can be run on samples from the live animal but they have not proven as accurate as the brain tests and are not routinely used.

There is now an oral rabies vaccine approved for use in wildlife. Raboral V-RG © (Rhone Merieux, Athens, GA) has been shown to be safe and effective in trials in Virginia and Pennsylvania. However, there is no evidence to prove that the existing killed, intramuscular and subcutaneous, rabies vaccines approved for use in dog and cats, are effective in wildlife. While some work has been done to show that they will produce an antibody response in some zoo species, no challenge studies or duration of immunity research has been done.

There has been a lot of talk about controlling the spread of the rabies virus which has moved from Virginia to Massachusetts in 12 years. In 1991, 3, 079 cases of rabies in raccoons were reported, the largest number reported in the history of animal surveillance in the U.S. There were 1, 030 animals confirmed rabies positive in New York State in 1991 with 66% of the positives in raccoons.

While it may be possible to eradicate wildlife rabies in this country, it is important that control measure be developed. As wildlife rehabilitators we need to understand this disease and assist in the control measures. It is important that we don't let our emotions interfere with our responsibilities to the ecosystem.

We also need to be able to provide accurate scientific advice to the public. There is also no reason to assume that wildlife rehabilitators may not be held legally accountable for the professional advice given to the general public.

Dr. Stuart Porter is a member of the NWRA Board of Directors and one of its Vice Presidents. He is the co-founder and former Director of Veterinary Services of the Wildlife Center of Virginia. He is also Assistant Professor of Animal Technology at Blue Ridge Community College, VA.

The Board of Directors of the NWRA is concerned about the health risks to rescuers and rehabilitators who handle high risk rabies vectors in the midst of a rabies epizootic. Since these species often do not exhibit obvious clinical signs and since non-bite rabies transmissions is possible, every wildlife rehabilitator in these areas must decide on a safe and humane policy towards these species. The Board of Directors of NWRA does not recommend the treatment of housing and translocation of high-risk rabies vectors in the midst of a rabies epizootic. State wildlife agencies and public health departments should be consulted and their regulations should
be respected.

Rabies Shot

Pre-exposure rabies shots
Shots one and two are one week apart
Shots two and three are two or three weeks apart

Banner Occupational Health Clinics
www.BannerHealth.com/occhealth

Banner Desert Occupational Health Clinic
2225 West Southern Avenue, Mesa, AZ 85202
Phone: 480-412-3275 Fax: 480-412-8760
Hours: Monday-Friday 7am – 6pm

Banner Thunderbird Occupational Health Clinic
Paseo Medical Plaza
5601 West Eugie Avenue, Suite 213 Glendale, AZ 85304
Phone: 602-865-5618 Fax: 602-865-5651
Hours: Monday-Friday 7am - 6pm

BUMC-Phoenix Occupational Health Clinic
Edwards Medical Building
1300 North 12th Street, Suite 520, Phoenix, AZ 85006
Phone: 602-839-4456 Fax: 602-839-3182
Hours: Monday-Friday 6am - 10pm, Saturday & Sunday 8am - 4pm

Banner Gateway Occupational Health Clinic
1920 North Higley Road, Suite 108, Gilbert, AZ 85234
Phone: 480-543-3300 Fax: 480-543-2689
Hours: Monday-Friday 7am – 6pm

Banner Estrella Occupational Health Clinic
Estrella Medical Plaza
9305 West Thomas Road, Suite 235, Phoenix, AZ 85037
Phone: 623-327-4100 Fax: 623-327-4170
Hours: Monday-Friday 7am – 6pm

Wildlife Protocols

Protocols are standard methods of treatment, care, and action that have been established for many conditions or animals you will see at Liberty Wildlife. These apply to incoming wildlife, active rehabilitating animals, non- releasable animals, and educational wildlife. Protocols also specify who, how, and when volunteers or staff can interact with wildlife.

Details on specific protocols will be discussed throughout your training period. Follow these procedures precisely. Protocols are established for your protection and for that of your fellow volunteers as well as for the protection, care, and well-being of the animals.

Protocol Overview

Interacting with Wildlife - People can unintentionally have a detrimental effect on wildlife. This is the key to our policy on interacting with wildlife. This policy promotes respect and understanding for wildlife and focuses on our ability to retain the wild nature of these animals.

Death and Euthanasia - Discussion of Liberty Wildlife's philosophy on this difficult topic.

Working with The Public - Yes, there is a standard for working with people, too!

Biosecurity - The property at Liberty Wildlife is divided into two sections which separate the rehabilitation wildlife from the education animals. This offers protection for the education animals from possible diseases of incoming ill wildlife. Foot baths are placed around the property to clean feet before entering critical areas. When you see a foot bath, use it! Foot baths must be refilled daily and kept covered at night when not in use.

Avian Protocol - The avian protocols are detailed throughout the Medical Services Training Program and can be found in Liberty Wildlife's Medical Reference Guide.

Mammal Protocol - People are mammals too, and therefore are susceptible to many conditions that affect wildlife mammals. Care must be taken when working with mammals to protect yourself and others. You must have proper training and authorization to work with mammals. A separate protocol has been established for bats.

Bunny and Squirrel Protocol

Bat Protocol - Do not handle or touch bats or their containers, even if the animal has died. A pre-exposure rabies vaccine, training, and authorization are required to treat or provide daily care and food for bats. Special follow-up with the public is required on all bat arrivals.

Reptile Protocol - Do not handle or touch reptiles or their containers. Reptiles are a diverse group and "designer" breeding sometimes makes identification difficult. Know what you have before proceeding! Venomous reptiles have their own protocol.

Venomous reptiles - Do not handle or touch venomous reptiles or their containers, even if they are dead. Medical Services veterinarians, Program Coordinators, and specially authorized and trained staff will assess and treat venomous reptiles. They will also provide daily care and food. Remember, venomous reptiles can be a danger even after they are dead.

Interacting with Wildlife

It is crucial that each member of Liberty Wildlife understands the effect that human contact or even human proximity has on wildlife.

Wild animals do not want to be around people. If you approach them in the wild, they will usually retreat to a safe distance. Being held by a human is very stressful for a wild animal. *They do not understand that you are trying to help*. Keep that in mind at all times. Keep any contact short, concise, and as low-stress as possible.

Liberty Wildlife has policies directing contact with wildlife. These guidelines have been established for the best interest of the animals. ***If you feel the need to "connect" with animals like you would a pet, please find an organization that will benefit from such behavior such as the ASPCA or the Humane Society.***

Carefully review these points to remember:

- When you arrive for your shift, do not peek in bins, cages, or incubators. A large face peering in at a wild animal is stressful. Read the notes on the cages instead of looking inside at the animal.

- Do not give names to the rehabilitating wildlife, either in intensive care or in the outside enclosures. Liberty Wildlife's Education group goes to great efforts to explain to the public that wild animals are not pets. We need to support that philosophy within our organization at all times. Also, it makes it even more difficult for volunteers to handle the death or euthanizing of an animal that has been "named."

- Nurturing vs. caring. As caregivers of wildlife we are put in the unique position of caring for something that which should not tolerate or accept us. ***Do not pet or unnecessarily handle animals that are brought into Liberty Wildlife*.** When animals have conditions that make them seem tolerant such as imprinting, habituation, or blindness, they must still be respected. Do not hold wildlife (of any kind) unless necessary for a procedure. Do not allow an animal to stand or perch on you. Of course, we do not pet or kiss a wild animal or attempt any of the other interactions you might with a pet.

- To further reduce potential stress for wildlife, please keep conversations and noise to a minimum in the Intensive Care and Orphan Care areas. This is particularly important during the spring when there is a danger of young animals imprinting on people.

- Wildlife that is brought into Liberty Wildlife must stay at the facility. ***Bringing animals home is not permitted.*** Native wildlife is protected under Federal and State regulations and cannot be kept at your home. Liberty Wildlife holds Federal and State permits allowing the treatment and holding of these animals. Non-releasable animals are placed with approved facilities that have obtained the necessary Federal and State permits and only after approval from these same agencies. Even non-native animals that occasionally arrive must not be taken from the facility without specific authorization from the Medical Services Program Coordinators. This also applies to animals that have been donated to Liberty Wildlife as food. If you have any questions regarding this policy, discuss them with the Program Coordinators.

Death and Euthanasia

Death

The death of an animal is by far the most difficult experience you will encounter in wildlife rehabilitation. It is important to understand that death and dying are a very real part of any hospital care.

There will be animals that fight hard to stay alive. There will be animals that have lost their will to live. There will be animals that you will work very hard to keep alive—for days, weeks, or even months—that ultimately won't make it.

As caregivers, we are not exempt from grieving for the loss of an animal. Yet, even in the midst of the most heart-wrenching experiences, there are a few things you can keep in mind to help. The efforts of you and other volunteers have allowed this animal to end its life in a safe, protected environment. In death this animal is now free of any stress, pain, or suffering.

Euthanasia

Euthanizing an animal is a decision that is never made lightly. As difficult as euthanasia is for everyone who has worked to help save the animal, sometimes it is the kindest thing we can do.

The main factors in the decision to euthanize an animal are its pain or suffering and its quality of life. For example, if a bird's wing is severely injured at the shoulder and needs to be amputated, the bird may lose its entire wing. Loss of an entire wing presents serious balancing problems for a bird. Jumping from perch to perch is a tremendous challenge, often resulting in falls which cause further injury. One-winged birds can find it difficult to right themselves.

There are other conditions to consider in determining quality of life. Just the fact that it is "captive" can be stressful for a wild animal—there are some that never adjust to their new environment no matter how accommodating the structure has been designed. Also, federal or state laws may restrict certain conditions in birds used for educational displays. As you can see, there are many issues that are taken into consideration when making euthanasia decisions.

The education animals at Liberty Wildlife are non-releasable and serve as ambassadors for their species in the hope that they will help wildlife through education. We strive to make their

conditions as safe and comfortable as possible, although spending their life in captivity is far from ideal. There will be times that the physical or mental condition of an education animal change and quality-of-life issues become a serious concern. Euthanasia may be the only humane answer. Thinking of the animal's release from pain and suffering, or from a lifetime of captivity may help you to balance the sadness of the moment.

It is difficult to make the decision to euthanize an animal. Again, these decisions are never made lightly.

Article 2. “Euthanasia, The Other Release” is a reprint from NWRA Newsline, Volume 11, #3, Fall 1993.

Euthanasia, The Other Release

By Erica Miller, DVM
Newark, DE

(Greek: eu = good, thanatos = death)
1. an easy or painless death.
2. the deliberate ending of a life of an individual suffering from an incurable and/or painful disease.

Those are the literal and dictionary meanings, but what euthanasia means to most of us: 3. the most difficult decision we have to make. No matter what the situation; the act of performing euthanasia on a wild animal involves emotions. While we can’t remove the emotion, we can develop guidelines, which will help make the actual decision a little easier and hopefully remove some of the doubt.

First, we need to understand why we should perform euthanasia, and then we will consider when or in which instances euthanasia is our best course of action.

We can all agree that the majority of our patients are received in our care because they have been impacted by humans, either by directly injuring or disturbing the animal, or by damaging or disturbing the animal’s environment. Because human actions have interfered with the animals’ right to live wild, rehabilitators function to fulfill their right to be humanely treated. That is the essence of the rehabilitator’s role. However, we must remember that a key term here is the word “humanely”. We also fulfill the animals’ right to receive euthanasia if the act is more humane than attempting treatment.

The animal with a terminal illness or fatal injury deserves the best treatment we can provide. We have no right prolonging that animal’s pain or discomfort by attempting other treatment or even by allowing the animal to die without our assistance. As Kay McKeever puts it so well, we need to think of euthanasia as “the ultimate GIFT of mercy to a wild creature doomed by its injuries”.

But what about animals which don’t appear to be suffering? Animals which we could help over a long period of time? Animals which might fully recover from their illness or injury? How do we determine when to perform euthanasia and when to attempt treatment? How much is too much?

I can’t begin to provide answers for every wildlife case we receive, but I would like to provide some guidelines; some are obvious, others may just be something to think about.

If an animal cannot be returned to a normal life in the wild, the only options we have for it are a life in captivity, or euthanasia. If we opt for a captive life, we must be certain that we have just cause for keeping the animal: for use in education, as a surrogate parent, or in a breeding program; and that the animal can be kept in a situation where it has adequate caging with proper stimulation, correct diet, minimal stress, and any other factors we can contribute to provide the animal with a quality life.

So, first we need to determine if the animal can be released in a condition which will allow it to have a normal life in the wild, then we need to determine if we can provide it with a quality captive life or if we should provide it with a humane death. Above all else, when making decisions about an animal's life, we need to remember that these are wild lives, designed physically and mentally for life in the wild.

1. No animal with vision impairment in both eyes should be released.
2. No bird can survive normally in the wild with any portion of the wing missing.
3. No fracture involving the joint (or even very close to the joint) in a bird's wing will heal well enough for that bird to regain normal flight.
4. No mammal with impaired use in two or more legs can move well enough for release to the wild.
5. Raptors and mammals which are human imprinted are not behaviorally equipped for life in the wild, and they may pose a threat to humans.
6. Compound fractures more than 24-48 hours old are general irreparable and necessitate amputation - i.e. will make the animal non-releasable.
7. Raptors and waterfowl require both legs to hunt/swim, so amputees cannot be released. Most waterfowl can manage with one foot amputated, as long as they can weight-bear on that leg. Many small songbirds can be released if they have only one leg.
8. No animal should be released if it has high likelihood of shedding/ transmitting a disease to the wild population (e.g. raccoons continue to shed distemper and parvo viruses for a period after recovery).

These are just some example of things to consider --and they are the more obvious ones. Some of the criteria we must all use when making the decision to provide treatment versus euthanasia are these:

1. Will the animal be able to maintain a life in the wild which is normal for others of the species?
    a) Does it have adequate vision, hearing and physical ability? (e.g. can it hunt/find food, can it evade predators, etc.)
    b) Does it have the strength to perform the activities needed by that species? (e.g. roam large territories, fly to certain heights, migrate, dive certain depths, dig burrows, etc)
    c) Does it have adequate functions of its limbs to perform necessary activities? (e.g. hold food in its paws or talons, climb trees and jump from limb to limb, fly between tree branches, etc.)
    d) Are its mouth parts adequately functional? (e.g. does the rodent have opposing incisors intact so that one won't overgrow, does the pelagic bird have a beak

which can still spear fish: does the hard-billed songbird have a beak which can crack seed shells, etc.)

e) Is the animal behaviorally normal? (e.g. can it socialize with others of its species, can it reproduce, etc.)

2. Can you provide an adequate habitat in which to release the animal once it has recovered? Sometimes animals, which are not 100% functional in some ways, can survive in certain habitats (e.g. a non-migratory songbird released in an area with many bird feeders; a waterfowl released in a pond, which is kept open year-round.

3. If the animal is to be kept in captivity during a long recover period or permanently, can you provide housing and nutrition, and fulfill its other needs for an adequate quality of life?
    a) Will your cages prevent feather, foot or keel damage?
    b) Will your cages provide room for adequate exercise?
    c) Will your cages provide shelter and options for a variety of locations (high, low, shade, sun, various perch sizes.)?
    d) Can you provide the necessary nutrition in terms of quantity, and quality (adequate calories, protein, vitamins, minerals)?
    e) Can you provide proper conspecific socialization and other forms of stimuli?
    f) Will the animal serve a useful purpose (e.g. surrogate parent, breeding animal or educational animal) -- wild animals weren't "designed" for life in a cage.

As I stated before, I can't provide a "cookbook method" of when to treat an animal or when to provide euthanasia, but I hope I've been able to offer some things to consider when a doubtful case arises. Euthanasia is an act which will always involve our emotions, no matter how many times we perform it, but we must remember to consider the patient, a wild animal, first, and deal with our emotions second if we are to truly provide a service to wildlife.

Erica Miller, DVM is on staff at Tri-State Bird Rescue & Research, DE. She is also a member of the Board of Directors of NWRA

Why Must We Euthanize Birds?

By Lynne Frink
Newark, DE

At Tri-State Bird Rescue & Research Inc. we have been taking care of injured wild animals every day of the year for 15 years. For most of us it is our life's vocation. What gives a human being the right to decide whether another living creature should live or die? I have no answer to that question. Those of us who have dedicated our lives to wildlife rehabilitation have a deep love of wild animals and a deep commitment to their well-being.

It is important for the non-rehabilitator to understand that the minute a wild animal is picked up by a human being, we know that it was, in nature's eyes, a dead animal. Wild animals live in constant threat of being eaten by another wild animal; wild animals must escape predators in order to stay alive. A wild animal, which is picked up by man, is an animal so sick or injured that it could not escape its enemy.

This is the type of animal a wildlife rehabilitator deals with - not the poodle with a skin rash or a kitten with an eye infection. Animals delivered to rehabilitators are dying animals with severe traumatic injuries, toxic reactions or infectious diseases.

When we first started as rehabilitators we did not know how sick the animals were that came through our door. After all, they did not moan or cry out: some of them looked normal.

We soon learned that all wild animals (except the newborn) mask symptoms. After all, if you were one of a heard of wild deer and a pack of wolves chases the herd, which animal is the pack going to single out? The deer that limps, or droops its head. Animals don't show pain and try to hide injuries. An owl that looks fairly alert and stoically silent one minute can be dead the next.

So we learned that the animals that come to us were usually very sick. But, we tried to save them all. Often, we would have 200 or more very sick animals. They needed hand feedings or tubing's, cage cleaning, mediations, 2 or 3 or more times a day. Not having the experience to know which would get better and which would die, we worked 12, 14, 18-hour days trying to keep the animals alive. As the years passed we learned a lot of lessons.

1. We learned that human beings can get so tired and so sick trying to save every suffering creature that they can completely lose their ability to help at all. I doubt that anyone can understand this unless he or she worked day and night, month after month trying to save dying creatures.

2. Through years of painful learning experiences, we slowly gained enough experience to look at a bird and know what its chance for recuperation are. We learned that an owl with a heavy parasite burden and an open, comminuted fracture would never fly again. And we learned that he would never be able to stand up straight or perch and that he would grow miserable and depressed and dirty sitting in a small cage for the rest of his life. We learned that when a goose or a gull did not respond to treatment for heavy metal poisoning that it would be neurologically impaired and perhaps brain-damaged, and would never be able to take two steps together again in its life.

So, what were we to do? We continued to receive injured wild birds, from tiny chickadees to eagles, all the time. Our money was limited. The hours of the day were limited. We could dedicate our lives to keep crippled animals alive in cages. We could work morn to night hand feeding them and exercising their legs so that they were able to defecate. We could work dawn to dusk to make their captive, confined lives a little less painful.

We knew that we were very good rehabilitators - in some areas of expertise we were the best in the world. We could make the choice to select the birds which had a chance for survival and freedom and pour all of our efforts into those wild creatures.

After 15 years of caring for wild birds, we felt we had a pretty good feeling for which birds would recover - and we decided we would do all in our power to help them.

And as for the birds that were so badly mutilated, injured or diseased that they can never fly or even walk in the wild again? We could euthanize these birds. We could release these wild creatures from their tortured bodies so that their spirits, at least, could fly free again.
We have dedicated our lives to relieving suffering in wild animals and returning them back to the wild. We don’t like to euthanize birds. We have never euthanized a bird without our heart breaking a little.

But the lessons that have taught us which birds wouldn’t recuperate have also taught us which bird would. And watching that bird lift from my hand and fly free again is the greatest gift I know.

Avian Protocol

The majority of calls on the Wildlife Hotline are calls about birds. Therefore, most of the wildlife arriving at the facility are birds.

Birds have evolved many physical adaptations that make flight possible. Hollow bones reduce weight. Feathers cover skin providing insulation and aiding in aerodynamics. Organs may be reduced in size or number, again, aiding in weight reduction. Helpful additions to the respiratory system include air sacs and pneumatic bones. These are specialized features and must always be considered in treatment.

Liberty Wildlife's avian protocol is detailed throughout this training program. You will be provided with step-by-step instructions on care, treatment, and the continued well care of our avian patients.

Although some procedures may be familiar to you, please wait until you have completed training *and have been signed-off to* proceed before attempting medical treatments or assessments. Remember the three basics of avian care: ***(WDQ) warm, dark, and quiet***—these help more than you think!

Guide to Identification of Hatchling and Nestling Songbirds

Marty Johnson
Wildlife Rescue, Inc., Palo Alto, CA 94303
1995

Pink to Red Mouth Birds

Species	Mouth Color	Gape Flanges	Beak Contour	Down	Legs / Feet	Approx Weight in grams Hatchling	Nestling	Adult (F)	Feeding Call	Feathers	Special Features
House Sparrow	pink	medium, yellos,	short, cone-	done	short, chunky	2-13	14-20	27	melodic single	smooth, gray-	
Rufous Sided Towhee	pink	pale yellow	shaped conical and pointed	dard gray	long legs, big feet	3-18	20-29	39		dark back, white spots on wings & tail	
California Towhee	pink to red	pale yellow not prominent	conical and pointed	long, brown-gray on head, back and wings	long legs, big feet	4-20	25-39	52	high-pitched repeated like crickets chg to single peep	brown	
Brown-Headed Cowbird	deep pink	white to cream not prominent	heavy, to a pt narrower than a towhee's	long, snow-whjte	long legs, big feet, blk tipped nails	3-20	25-30	39	continuous high-pitched vibrating sound	breast yellowish when coming in	bald face, parasitic, often found in nests of towhees
Northern Oriole	deep pink	pale yellow	long, pointed narrow	long, white-it gray on back, wings, 2 rows on head	long, slate-gray legs	2.5-18	20-25	33	high, staccato, repeated notes, similar to blackbird	yellow breast, gray back, white wing bars	insect eater
Lesser Goldfinch	red	pale yellow	similar to finch	grayish	short, pink, stubby	1-6	7-8	10		green to rust back, yellow abdomen	red dot at corner of gape flanges
Red-Winged Blackbird	red	yellow, not prominent	long, pointed	scant, white on back, lower wings, and thighs	long legs	3-15	20-30	42			bald face, similar to cowbirds
Brewer's Blackbird	red	white, not prominent	long, pointed	blackish-gray, fairly plentiful	long legs, white toenails	3-15	20-30	42	raucous, repeated call, sounds like a rusty hinge	black	
Scrub Jay	red	white, not prominent	long & wide	none	long legs, grabby feet white toenails	6-30	35-70	87	hatchling - short repeated peeping, later a single squawk	furry gray head, blue wings and tail	ruddy skin
House Finch	red	white to yellowish	short, conical	white, long and plentiful - 4 rows on head	short, stocky	1.5-8	10-15	54	none when newly hatched, then high-pitched peeping	stripey, gray/ white chest	
Crow	red	white	very long, large heavy	sparse, gray-brown on head, underpartst	long, heavy	18-70	70-328	438		black	ruddy skin

PINK TO RED MOUTH SONGBIRDS INCLUDE: Blackbirds, Cowbirds, Crows, Finches, Goldfinches, Grosbeaks, Jays, Orioles, Sparrows, Tanagers, Towhees, and Waxwings

Guide to Identification of Hatchling and Nestling Songbirds

Marty Johnson
Wildlife Rescue, Inc., Palo Alto, CA 94303
1995

Yellow to Orange Mouth Birds

Species	Mouth Color	Gape Flanges	Beak Contour	Down	Legs / Feet	Approx Weight in grams Hatchling	Nestling	Adult (F)	Feeding Call	Feathers	Special Features
Starling	bright yellow	bright yellow, very prominent, lower larger than upper	very wide	grayish-white, long and plentiful on head, back and wings	long legs	5.5-30	40-60	80	hatchling-single squeaky note	gray-black	
Mockingbird	yellow	yellow	wide	dark, gray, plentiful	long legs	5-18	20-32	43	hatchling-single, clear, piping note, then throaty bark	gray and white striped wing and tail	gray indes, cresent markings on roof of mouth
Robin	yellow to yellow-orange	pale yellow	wide	sparse, cream on head, back and legs	long legs	5-35	40-60	77	hatchling - staccato trill	rust-tipped speckly chest	skin often yellowish
Black Phoebe	bright yellow-orange	bright yellow	wide, flat tapering to a point	gray & sparse	long, thin legs	2-5	7-15	18	peep-peep	brown-tipped black feathers	insect eater
Pacific Slope Flycatcher	bright yellow-orange	yellow	flat, wide, pointy tip, 'arrowhead' look	white on head, back, and wings in "star" cluster	long, think, delicate, dark blue-gray, white toenails	2-6	7-8	11	insistent crow-like squawk, frog-like when older	buff-abdomen, buff and white striped wings	insect eater
Cliff Swallow	orange-yellow	flesh	very wide, flat pointy beak	light gray head and back	short legs, small, chubby feet	2-13	13-15	22	barking type chirp	nestling-light tan on back by tail, otherwise adult	insect eater, cavity nest
Violet-Green Swallow	orange-yellow	cream	very wide, flat pointy beakt	cream on head, shoulders and back	short legs	1.5-8	8-10	14		white eyebrows	insect eater, cavity nest
California Thrasher	orange-yellow	cream	curves down as nestling grows	dark gray on head, back, wings, thighs plentiful	long let	6-35	40-60	84		medium gray	
Chestnut-Backed Chickadee	orange-yellow	very yellow prominent	flat, wide	gray on head and back	long, pale bluish-purple	1-4	6-8	10	squeaky cheep	buff abdomen, black head, buff-white circles on side of head	insect eater
Bewick's Wren	orange	yellow	flat, wide, pointy	long, gray on head only	long, delicate	1-4	6-8	10			
Bushtit	deep orange-yellow	yellow	short	none	long, delicate	1-3	3.5-4	5	3 syllable "locater" call "mohawk" look	gray, first feathers on crown of head	feamles have blue eyes, cavity nesters
Wrentt???	deep orange	yellow	poiny	none		1.5-6	7-11	14		gray-brown	yellow inides

YELLOW TO ORANGE MOUTH SONGBIRDS INCLUDE: Bushtits, Chickadees, Creepers, Dippers, Flycatchers, Mockingbirds, Robins, Shrikes, Starlings, Swallows, Thrasters, Thrushes, Titmice, and Vircos

Mammal Protocol

Although Liberty Wildlife receives mostly birds, mammals do arrive at our facility. Only veterinarians, senior Medical Services volunteers, or others specifically authorized will assess and treat mammals and provide for their daily care and food. These animals are not to be touched, handled, or even transferred from their original container.

Liberty Wildlife has specific procedures in place for the treatment of mammals. In the future, workshops will be designed that provide training in this area. Information regarding their care will be discussed throughout this training program.

Cottontails and jackrabbits - Usually bunnies and squirrels are taken directly to small mammal rehabilitators that work out of their homes. These individuals are trained in the specialized care of these animals. It is important to take precautions around injured cottontails and jackrabbits as they can carry tularemia, a deadly disease that can be passed to people.

Squirrels, rats, mice, and gophers - These rodents have large teeth and are quick to bite. Although rodents tested in Arizona have not been rabid, some have been found to carry the hanta virus and other diseases which can be just as deadly.

Large mammals - Larger mammals, such as foxes, coyotes, raccoons, javalina, ringtail cats, and porcupines occasionally are brought in with injuries. Again, only senior Medical Services staff or veterinarians that are vaccinated against rabies and have been trained in large mammal handling and restraint are authorized to work with these animals.

Bats - Although bats are mammals, they have their own protocol. Do not handle bats in any way. Whenever a bat arrives, immediately refer to the bat protocol for additional information you may need from the public.

Bunny and Squirrel Protocol

In the Last few years Liberty has become one of the only places that will take in injured and orphaned cottontails, jackrabbits, and squirrels.

Training is provided on site to address how to handle them and we will cover some of the techniques along with the avian protocol.

There will be a group of volunteers similar to orphan care that will be taking on the feeding and care of these smaller rodents. The training for feeding will be separate but the training for intake will be on the job. You will learn how to administer fluids and treat wounds or injuries.

The hardest part of rehabilitation of rabbits is they tend to have a 90% mortality rate and this is pretty general everywhere. There are a lot of different rehabilitation centers that will not even rehab them. Rabbits stress very easily and use up the natural cortisol levels in their systems and so have a difficult time recovering.

Following is some very good information, some of which we have placed into protocols that we use on our rabbits.

Orphaned Cottontail Care (From Born to be Wild)

Cottontails are amazing animals. They can be incredibly tough, surviving wounds that would kill any other species, but are also very sensitive, sometimes dying from stress and shock without even being injured. They are one of the hardest animals to rehabilitate, but that makes the success even better. The three main keys to success with rehabilitating the cottontail that you must master to be successful in rehabilitating them are: getting them to eat, managing stress, and dealing with their sensitive digestive systems.

A big challenge to rehabbing cottontails is getting them to eat. They are some of the fussiest babies. They know we are not their mom and they are not cooperative. Bunnies are at the bottom of the food chain, which makes the, ever alert to danger. This poses a challenge because to the bunny, we are the enemy. You must gain the trust of your cottontails or you will only add to their stress.

The final challenge to the cottontail is their sensitive digestive system. The transition from formula to soils will claim the lives of many cottontails if proper steps are not taken to prepare them for the switch. In order to successfully rehabilitate cottontails. You must understand the challenged and keep working to find a way to overcome them.

Bunny Basics

Cottontails are born with no fur and their eyes closed. Their ears are sealed at birth. There are usually 4 to 6 babies per litter, but I have seen litters as small as 2 and as large as 13! Babies typically weigh 30-35 grams at birth.

By 2-3 days old, the babies are starting to get noticeable fur and their ears are no longer sealed, but are still held back against the head. They still have no fur on their bellied. They typically weigh 40-50 grams at this age.

By 5-6 days old, the babies are fully furred but the fur is very short. They may start holding their ears up but for the most part they are still back against the head. At this age, they typically weight 50-60 grams.

At 7-10 days old, their eyes open and they are holding their ears up more and more. They will begin exploring on shaky legs. It is normal for their head to wobble a little while they walk at this age. They should weight 60-80 grams at this age but it can vary greatly.

At three weeks old, they should be weaned and gaining weight well on the greens, oats, and timothy hay. A healthy weight at this age is anything 90 grams and up.

At five to six weeks old, they are ready for release. I wait until they have outgrown the sit and hide strategy and are confident they can outrun a predator (instead of sitting with their ears back not moving when you approach, they will sit and then take off when you get too close, like a cottontail would do in the wild).

They should weigh over 150 grams at release, typically 200-300 grams. They should be released in the evening (I release around 6 when it is still light enough for them to find their way around but late enough that it is close to their natural active time) in a bushy area. You should release at a time when good weather (no rain) is predicted for at least 2-3 days.

Formula

Zoologic 33/40 mixed evenly with Zoologic 30/55 or a multi-milk (both are the same thing) works the best. To mix the formula, combine the two formulas then mix them at 2:1 for full strength. So, if using a tablespoon as a measure, add 1 tablespoon of Zoologic 33/40 powder with 1 tablespoon of Zoologic 30/55 and 4 tablespoons of water.

Some other formulas that I have tried but did not like are Fox Valley formula 32/40 and Esbilac with Multi-milk. My cottontails on the Fox Valley formula tended to either bloat or get diarrhea on the 2:1 strength, so I had to keep them at 3:1 and then their weight gain was not very good. If heavy cream or multi-milk were added to this formula it might be okay for bunnies though.

I have also tried using Esbilac mixed with multi-milk, since I used to use Esbilac for my squirrels before the processing changed and my cottontails seemed to do well at first, but later some became very weak and even lost use of their back legs before dying. They seemed to have very weak bones.

Some formulas I have not tied but would consider trying if the bunnies had issues with the Zoologic formula is Fox Valleys 30/50 formula for Beaver. That is closer to a cottontail's needs than the 32/40 formula designed for cottontails. I would also consider trying Zoologic 33/40 with heavy cream added. I have heard from several rehabbers that hand feed their cottontails (I tube feed all eyes closed cottontails) that their bunnies love heavy cream and that KMR with heavy cream is readily accepted by the fussy babies. KMR alone in my opinion is too high in protein and too low in fat for cottontails, but with the addition of the heavy cream, that would increase that fat and it should be a good choice nutritionally.

There are many formula options and what works for me may not work best for you; so, experiment with the formulas until you find something that you are happy with. The protein and fat content should be roughly 30 and 50 respectively so in order to ensure you babies grow up healthy and strong, try to stay as close as possible to those numbers.

Getting your cottontails to eat

Cottontails are the fussiest babies when it comes to drinking their formula. They are one of the few animals that would rather starve than take formula from you. I hand fed my first litter of cottontails and it took me an hour to get 1 cc into them. I was spending all my time feeding them and I only had 2! When another litter came in I knew there was no way I could help them unless I found a better way. That is when someone recommended tube feeding and now I recommend tube feeding all bunnies that do not yet have their eyes open. Tube feeding will save you time and is easier on the bunnies.
With hand feedings, you run the risk of aspirating the bunnies and then they will most likely develop a respiratory infection, which can easily be fatal. The only risks with tube feeding are getting the tube into their lungs and then filling the lungs with milk, which would be fatal, and then puncturing the soft pallet and filling the neck cavity with formula, which is also often fatal. Both can easily be avoided though.

I use a 3.5 F tube for bunnies that are 1-3 days old and weighing under 40 grams and a 5 F tube for any babies 40 grams and up. When tube feeding, hold the bunny so that it is facing you and use your dominant hand to push the tube down. Use your other hand to hold the bunny's head still. Before you begin tube feeding, be sure to mark the tube with a line so you know when the tube is down in their stomach. To do this, lay the tube against the bunny with the tip just below the rib cage and follow the tube up to the mouth and mark a line where it is at the mouth. This marks the distance that the tube needs to go to get to the stomach.

Now you are ready to tube the bunny, hook the feeding tube up to the syringe and draw the formula up through the tube into the syringe (the idea is that if the formula draws up the syringe, it shouldn't clog going back out). Make sure to get rid of all the air bubbles and push the air out of the end of the feeding tube before putting the tube down the bunny. When you tube the bunny, the tube should go down the bunny's left side, which is your right if the bunny if facing you. Gently push the tube down until you get to the line you made on the tube. If the tube will not go all the way to the line, you make be in the lungs, so bring the tube out and try again. If you continue to have trouble, remeasure the distance to the stomach and make sure that the line is in the right place. When you get the tube down near the line, gently push until you feel it stop, that is when you are in the stomach. To begin feeding, put just 0.1cc down the tube and wait a little

bit to make sure no milk comes out the bunny's nose. If none does, slowly feed the bunny the amount that it should get for the feeding. The bunny should move its mouth like it is drinking the formula. If it does not, wiggle the tube a little in its mouth to see if it starts. If it doesn't move its mouth, that could be a sign that something is wrong and you should take the tube out and try again.

I always use a 3-cc syringe for bunnies under 40 grams and feed just 33 ccs and I use a 5-cc syringe for bigger babies and never exceed 5 ccs per feeding. I feed my cottontails 8-10% of their body weight 3 times a day until they are 70 grams, then I cut back to 2 feedings a day. At 80 grams I cut them back to 1 feeding a day, and I wean my cottontails (provided they are eating greens well and at least maintaining their weight without formula) at 90 grams.

Stress

Managing stress will be a major key to success with cottontails. Even babies that come in eyes closed and are used to you caring for them can stress out and die. You never know what will freak a bunny out. It can be anything from a dog barking to even a plastic bag, the noise of a tarp, beeping of an alarm, you never know.

A few pointers that work for me are:

- Put sheets or pillow cases over their aquariums
- Establish and maintain a schedule
- Keep the area as quiet as possible and find an area out of the way that won't constantly have people walking through it
- Don't house near predators or other noisy animals and provide plenty of hiding places in their cages

Digestion

The number one issue for eyes closed bunnies is digestive issues. Many bunnies will seem healthy and then suddenly get diarrhea or bloat shortly after eating solid foods. The cause of this typically a lack of gut flora needed to digest greens and other solid foods.

Using cecotropes from an adult domestic rabbit can prevent this in nearly all cases. Cecotropes contain the enzymes and bacteria that cottontails need to digest regular food. Baby bunnies are born with a sterile gut and their mother's milk is acidic, which keeps bad bacteria from taking over and making the bunny sick. Then when the babies open their eyes, they eat their mother's cecotropes and are weaned onto a diet of greens with no issues.

Like all wild prey animals, cottontails are very easy to fatally overstress. They mature much faster than domestic rabbits and when they go down-hill, they do so quickly, rarely giving you time to correct the problem causing it. Baby cottontail rabbits are one of the most difficult of all wildlife orphans to successfully rehabilitate and there is a 90% mortality rate of baby rabbits in human care.

Rabbit mothers nurse their babies twice a day, early in the morning and again in the evening. Mom does not stay by the nest after the babies are born. Babies should be quiet most of the day. If they cry then they are not getting fed enough.

What are some of the main reasons baby bunnies do no survive?

Sometimes too much time has passed and too many stressful things happened to the babies before they came to Liberty. On hot days, baby rabbits can dehydrate rapidly and cold or rainy weather is tough on baby rabbits. Cats are major predators of rabbits and many of these bunnies die from the bacteria in the cat's mouth while others are just stressed beyond recovery.

Death due to lack of natural milk is common in babies that are under 2 weeks of age. Cottontail mother's milk (colostrum) has protective ingredients that artificial milk replacements cannot duplicate. Baby bunnies receive protective antibodies from their mothers while they are still in the womb. During babies first 12 days of life, mother's milk contains those same antibodies and without it those needed antibodies are lost. The most common cause of death is failure to establish normal bacteria in the intestinal tract at the time of weaning. Without the protective antibodies the bad bacteria over runs the good bacteria resulting in death. Sometimes the bunny will have an extended bloated stomach and/or diarrhea, but not always. Most of the time, there is no warning, just sudden death. Hand raised bunnies are not at a major disadvantage in that they are more susceptible to infections. We can feed the babies cecotropes which is the night time poop of healthy adult rabbits. The poop is sticky and smell but it contains good bacteria and antibodies. If anyone has captive bunnies, they can bring some and we can give it to the babies.

Collecting the Cecotropes

Cecotropes are a special poop that is excreted only at night or in the early morning. It is softer than their regular poop and will not have the strands of undigested plant material in it like the regular daytime poop has. You will need to put an Elizabethan collar (E collar) on the rabbit to get the cecotropes because they eat them themselves each night. You want to get the cecotropes as soon as you can because they tend to dry out and harden up if left for too long. You can collect cecotropes from a bunny for up to 3 days in a row with no ill effects. You do not want to go much more than that though, because they need the cecotropes themselves to maintain their gut flora.

Storing Cecotropes

Keep the cecotropes in a Ziploc bag in the refrigerator for up to 1 week.

Giving the cottontails the "Chocolate Milk"

Some bunnies will eat the cecotropes but most will not. If they will not eat them, you must mix it into their formula and hand feed it to them. There are two ways to do this and both work equally well. If you hand feed your cottontails the regular way, you can measure out 1 cc of formula per bunny and then add 1-2 cecotropes per bunny to the formula and feed each bunny 1 cc of the "chocolate milk" as I call it. The mixture will be very thick and you should ensure that the bunnies chew up the pieces. Each bunny needs to get 1 cc of the mixture 1 time a day. Then you can give the rest of the feeding as regular formula.

If you tube feed, you can measure out the formula needed for the full feeding and mix in 1-2 cecotropes per bunny. This needs to be mixed thoroughly and you should mash the cecotropes with a spoon and make sure all of the chunks are broken up. Since this still jams the tube up, put the mixture through a sieve. Then, when tubing, I always attach the tube to the syringe and then draw the formula up through the tube because if it can go up the tube, it shouldn't jam coming back out. Then each bunny should get the regular amount of the "chocolate milk" that it gets for a full formula feeding. The bunnies need to get the "chocolate milk" mixture once a day.

Basic Medical Care

Babies should be kept in a bin with a secure lid (they can be escape artists) and a warm, dark place to hide. Place a heating pad on low setting under the bin. Neonates will need to be kept in a brooder till furred, and eyes and ears are open.

THE FOLLOWING PROTOCOL SHOULD BE FOLLOWED FOR ALL COTTONTAILS UNDER 80 GRAMS:

- Administer 10% of their body weight in fluids every day. Administer Normasol or LRS subq between the skin at the shoulder blades.
- Weigh EVERY baby bunny in ICU in the AM and record weight on the green card. If multiple babies are housed together marker their heads with nail polish or a sharpie for identification.
- Administer Sulfatrim PO BID

Stimulate before and after feeding (if eyes are still closed). We have special green cards for the bunnies and squirrels.

Each bunny progresses differently and some may be weaned quicker than others so monitor closely. For neonates and very young babies hand feed approximately every 2 hours using the magic nipple and follow bunny feeding guidelines.

Cottontails should be released as soon as they are eating greens, are approximately 5 inches in body length and are afraid of humans (about 4 weeks).

Jackrabbits are released much later (9 weeks up). They will be small, but the longer you keep them, the more agitated and difficult to handle they will become and the less likely their chances for survival in the wild.

Handling and Restraint of Older Bunnies (not neonates)
When rabbits are picked up they are prone to kick with their hind limbs, which can result in a broken back. An animal with a broken back must be euthanized so proper restraint and handling is crucial.

Rabbits should be handled firmly but gently. Always support the rabbit's hind quarters and do not pick up the rabbit using only under the belly or by the ears. A towel can be loosely placed over its head or wrapped around the body to safely restrain the rabbit. To carry, place it snuggly against your body with its head covered. Keeping the eyes covered helps the rabbit to relax.

Caution: the older the cottontail, the more stress it realizes and the more careful you must be. Cottontails (especially adults) can literally die of stress and fright. They can also kill themselves trying to get away from you/or out of an enclosure.

Baby Squirrel Care

A healthy baby squirrel, while in the hairless state, is bright pink all over, with pink gums and lips; it squirms, responds to touch, feels warms, and is fat and round. A dehydrated or cold baby is grayish pink with grayish gums and lips; it will ball up, be unresponsive, sluggish or lie still; it will look thin and feel cold to your touch. A healthy furred baby will have very pink gums, respond appropriately to its environment, feel warm, and look round and full.

GET THAT BABY WARM! (Read and do first before going any further)
A baby squirrel should feel much warmer than your skin. If it feels cool to your touch then it is cold. Hypothermia will kill. Do not attempt to feed a cold baby. Until the baby is fully furred, they do not produce enough body heat to warm themselves. A furred baby who is sick or injured will need a heating source. Wrapping it in a blanket will not suffice since the baby cannot warm the blanket. You must provide a constant heat source. The most dependable and accessible is an electric heating pad. Turn the pad on low and place the nest box half on and half off the pad to provide a cool place if the baby becomes too hot in one area.

HYDRATE THAT BABY
In addition to warmth, the most important first treatment you will give the baby squirrel you have found is rehydration. Any baby has encountered trauma by being separated from Mama; the separation may have been a few hours or days. The younger the baby the greater the risk of dehydration and if you do not rehydrate you will lose it. Even the healthiest looking babies should first be rehydrated. Most people immediately give the new baby milk of some kind. **DO NOT DO IT**. A baby will not starve to death over a 24-hour period, but it surely can die of dehydration.

Why is rehydration so important?

Water is essential for the digestion of food and enables the body to perform other functions that sustain life. Rehydration defined is a period of time wherein no food is given and electrolyte fluids are administered to repair damage from dehydration, refill reserves, and re-establish body chemistry. The extent of rehydration is based on the extent of dehydration.

Rehydration and digestion are mutually exclusive processes; they cannot be achieved at the same time. When food and water are introduced to the stomach, the water in the stomach is not used for digestion: the stomach makes a demand on the cells of the body to give up fluids to digest the food; the cells will give up fluid no matter how little the body had at the time of demand, leaving the body further depleted. The water in the stomach is not absorbed until it reaches the small intestines, after the digestive demand has been made; what is absorbed then is not enough to repair and refill, so a downward spiral ensues with each feeding: food causes digestive demand followed by more fluid depletion followed by more severe dehydration, ending in death in a few days if not immediately.

Without initial rehydration, you will have a thin, dry, grayish, little mummy, too weak to lift its head, instead of a precious, fat, round, wet, pink baby. If you have already given formula, then stop immediately and start over with rehydration. Again, rehydration and digestion cannot happen at the same time so rehydration has to be accomplished before food is given. Remember that rehydration is a temporary measure meant to address deficiencies and should not be continued indefinitely.

Pink babies should be given a couple of feedings of plain water during the day to make sure their hydration stays up. I recommend a water feeding first thing each morning and one before you go to bed.

Not only should a regimen of rehydration be initiated before food is given, for a length of time and volumes depending on the extent of dehydration, but the proper fluid must be used. Gatorade is not rehydration fluid; it is designed to keep athletes hydrated. Gatorade has a high salt content, which promotes fluid retention and may cause diarrhea when given inappropriately. Pedialyte is the best oral re-hydrator available to the public, with Lactated Ringers best.

Hydration Instructions

Choice #1: Use fruit flavor Pedialyte, an infant rehydration fluid available to the public in drug and grocery stores. Pedialyte is designed to replace lost body fluids and electrolytes. DO NOT MIX PEDIALYTE WITH FORMULA.

Choice #2: Lactated Ringers by subque injection (the best rehydration fluid because the formulation resembles blood chemistry, and if the animal is unresponsive and cannot drink, the only method of rehydration).

Choice #3: Homemade rehydration fluid: 1 qt. water, 1 tsp salt, 3 tsp sugar. This is meant only for situations wherein, for some reason, you cannot get Pedialyte or Lactated Ringers. It is not a full electrolyte solution, but it is better than nothing.

Warning! The only fluids that should ever be offered to a baby squirrel are rehydration formulations for human infants, such as Pedialyte or a milk replacement formula appropriate for squirrels (such as Fox Valley Day One). Inappropriate fluids will make dehydration worse and/or cause life-threatening diarrhea.

How long to rehydrate and how much fluid to give: How long to rehydrate depends on the amount of dehydration. To determine amount of dehydration and how much fluid to give, do the following:

- Do a skin turgor test: Pinch up the skin along the spine behind the shoulder blades then watch how the skin relaxes. If it returns fairly quickly to flat, then the baby is only mildly dehydrated – rehydrate for 6 hours then introduce formula diluted with plain water; if it returned slowly but consistently to flat, then the baby is moderately dehydrated – rehydrate for 8 hours, then introduce formula diluted with plain water; if it stays in a peak you have a very dehydrated baby, a life-threatening situation – rehydrate for 12 or more hours. Repeat the initial test several times to get an average of the readings, then rehydrate accordingly. Give all of the oral fluids the baby will take every 30 minutes if they only take a small amount, and every 1.5-2 hours if they take a large amount. Do not fear to over hydrate orally you are far safer in giving a large volume or oral fluids than you are in cutting short the amount or the length of time of rehydration. One can over hydrate by subque injection. As far as amounts go, that depends on the age of the baby since an older baby can take in more volume than a younger one can – just give as much as you can get the baby to take every time you offer the fluids, and offer them frequently.
- Assess the baby's general condition – ask yourself: does the baby look thin with hip, ribs, and backbone showing? Do they have an appetite or not? Are they lethargic? Unresponsive? Are they cold and if they are warm in their nest box, do they cool off immediately when they are removed from that environment? Are they weak, unable to hold onto your fingers? Are their general body color, gums, and tongue grayish (a healthy baby is very pink)? Are they urinating well or not? Is the urine clear or somewhat yellow and thick? In a very dehydrated baby, you will find all of these symptoms, but a baby can be slightly dehydrated, showing only a few of the symptoms to a lesser degree or none at all to the inexperienced eye. To be safe, always rehydrate based on your best assumption of the amount of dehydration.

Positive responses to rehydration: You will see a remarkable difference in your baby. A rehydrated baby will gain weight on fluids, be eager to eat, responsive rather than lethargic, have a strong grip, elastic skin, and will urinate copiously. Their body temperature will be stable. Urine will be clear (fox squirrels do have a more yellowish urine naturally but there should be plenty of it).

If you have a baby who was separated from Mama due to a tree cutting, has no injuries, and was taken into care immediately, then they should be well hydrated because they were with Mama so recently – in that case, no rehydration is necessary.

Treating Wounds – the 3 most commonly encountered

Cate bites kill. Cat bites must be treated with a wide spectrum antibiotic such as Clavamox (safe and contains clavulanic acid as well as amoxicillin). Don't accept amoxicillin alone – it will not kill the gram-negative bacteria that is in a cat bite. Clean all punctures by flushing with betadine. Hydrogen peroxide is a poor antibacterial flush.

Head injuries with major swelling are more difficult because a steroid such as dexamethasone should be administered to reduce pressure and damage cause by swelling of the tissues and fluid. This drug can be dangerous if not use properly. The proper dosages should be observed and given for 3 to 5 days.

The animal must be withdrawn slowly, with decreasing dosages, or it will die from the withdrawal. A liquid form is available. A baby with a head injury will fall or drift to one side and carry the head to that side. The swelling from the injury will probably be noticeable.

A fractured leg, unless it is a complete break and the leg is misaligned, should not be taped. Taping can cause many problems and the baby will grow so fast that a fracture should heal before the baby is old enough to be up and about.

Feeder, Formula, and Introducing formula to the Baby

Feeders: The right feeder is a syringe, in the sizes of 1 cc syringes for a pinkie, 3 cc syringes for a 3 to 5 week old baby, or 6 cc syringe for a 5 to 6 week old plus baby. DO NOT USE PET NURSER BOTTLES – you can aspirate the baby with a bottle (get milk in the lungs, causing pneumonia or outright drowning). If available use a magic nipple.

Formula: the right formula is Esbilac Powder Milk Replacer for puppies with heavy whipping cream or distilled water added. Scientific studies show that Esbilac Powder more closely resembles mother squirrel milk than any homemade formula or other brands. Be sure to use Esbilac Powder – the liquid is not exactly the same formula; in addition, it is less nutritious because it has a greater dilution than the powder will have after reconstituting. Additionally, do no use Hartz Nursemaid, Mother's Helper' human infant formula, goat's milk, evaporated milk, or other cow's milk. These products are so poor nutritionally that they can cause the death of your baby through starvation, diarrhea, or malnutrition; if you baby does survive being fed these poor formulas, they will be small, weak, and prone to metabolic bone disease.

Mix and handle the formula as follows: 2 parts of water to 1 part of Esbilac Powder and ¼ part of heaving whipping cream. Mix in a small jar what you think you will use in 2 to 3 days. Refrigerate mixture and the powder too. Warm only what you will need each feeding to a little better than room temperature.

Initial Rehydration and Formula Introduction Schedule: do not fail to follow the schedule below. This schedule will continue hydrating the baby and also will introduce the formula gradually so that the baby doesn't react adversely to a new food. The proportions noted in this schedule are based on a 3cc syringe.

Feeding #1: Into the syringe put ½ cc of the formula, add 2.5 ccs of plain water. Give the baby all it wants.
Feeding #2: Into the syringe put 1 cc of the formula, add 2 ccs of plain water.
Feeding #3: 1.5 ccs of the formula, add 1.5 ccs of plain water.
Feeding #4: 2ccs of the formula, add 1 cc of plain water.
Feeding #5: 2.5 ccs of the formula, add ½ cc of plain water.
Feeding#6: You have reached full strength formula which you will continue to feed.

The baby should now be sucking enthusiastically and when finished eating, sleeping satisfied and quiet with a little round belly. Note: give the tiny pink babies some extra water every day because they dehydrate easily. You can stop this when the baby's hair begins to emerge and they look fat and healthy.

How often do I feed the baby?

Tiny pink babies without hair or with scant hair appearing on the back of the head and shoulders, can only ingest small amounts per feeding so more feedings are necessary. They should be fed about 2 to 3 hours throughout the day. Ideally, a tiny baby would be fed twice a night, but most of us must work and sleep is necessary for us to function. Be diligent during your waking hours and the baby should be alright. If the baby is dehydrated or sick then it may need more feedings until it is fully recovered.

As the baby grows and can ingest more formula at each feeding, the times between feedings can be increased until, at approximately 5 weeks of age, you are feeding it every 4 hours. As the baby goes through weaning and is ingesting increasing amounts of solid foods, you can decrease the number of feedings per day until the baby is eating only solid foods and has rejected the formula – this rejection will usually occur around 10 weeks of age, although some babies differ from this pattern. If one wants formula longer, give it.

Bathroom Business

An infant squirrel should be stimulated to urinate and defecate every time you feed it. Failure to do so can cause uremic poisoning. All mother mammals lick their babies to initiate this process and to keep their babies clean. A baby will leak on themselves but this is not the same as voiding a bladder. And also, an unclean baby will get diaper rash and/or urine burns on their tender belly. Stimulate by tickling the baby's genitals with a cotton ball or other soft, absorbent material. Stimulate until the baby is around 6 weeks old.

When you first get the baby, its stools will be a hard dark brown. Within 24 hours of feeding formula, the stool will change to a mustard brownish color; it should remain firm. If it is runny, then you have diarrhea. Add water to the formula for a couple of feedings (about ½ water, ½ formula) then continue with full strength formula. The baby might have been slightly dehydrated. Another reason for runny stools is overfeeding. A baby's belly should never look bloated after feeding – it should be nice and round. If the diarrhea does not stop in 24 hours, it may be serious, such as extreme dehydration, a parasite such as coccidia or a bacterial infection. Albon is the treatment for coccidia, as well as for some gram-negative bacterial infections.

How old is the baby?

1 to 5 days	Tiny, the size of a thumb – knuckle to tip – and totally pink, no hair at all
5 to 10 days	Development of soft, reddish, sable hair around nose and mouth
10 days to 2 weeks	A grayish purple shadow begins spreading over the head, shoulders, and back; the belly and legs are still bright pink
2 to 3 weeks	Grayish purple color deepens until the emerging hair is long enough to be identified as hair
3 weeks	The baby's lower front teeth begin emerging. Hair is now slick, smooth, and shiny. Still no hair on legs and belly
4 weeks	Has light grayish brown hair all over except lower legs and belly and under tail; some downy white hair beginning on belly and legs.
5 weeks	Thicker hair, including legs and belly, tail hair is short, straight, and lies parallel with the bone; eyes open
5 to 6 weeks	Upper front teeth begin emerging; begins curling tail over back
6 to 7 weeks	Fully furred, sleeping less with more active periods
7 to 8 weeks	Tail is fluffy, should be placed in a cage with plenty of room to play
8 to 9 weeks	Looks like a miniature squirrel, very active and shredding your sweaters, curtains, furniture, and arms with its claws; has lost infant appearance
9 to 10 weeks	Develops more muscular physique
10 to 12 weeks	About ¾ full size, release at 12 weeks

Feeding Schedule and Diet

The babies' eyes open at 5 weeks old but they don't see well at first and nothing about their behavior will change for another 5 or 6 days; they will still east and go back to sleep immediately. At 6 weeks, put monkey chow (called Zupreem Primate Chow) or rodent chow (no gerbil or hamster food) into the nest box with the baby. It will at some point begin gnawing on the monkey chow. Primate, or monkey, chow is a balanced nutrition and, in combination with fresh veggies and a diet low in nuts/seeds, has been proven to prevent metabolic bone disease, a disease caused by a lack of calcium in the diet.

Feeding Schedule

Up to 2 weeks	Formula approx. every 2 hours; feeding amount: up to 1 week of age – approx. 0.5 cc per feeding; 1 to 2 weeks – 0.75 to 1 cc per feeding
2 to 3 weeks	Approx. every 3 hours; feeding amount: begin feeding the number of ccs in weeks of age (ex. 2 ccs at approx. 2 weeks)
3 to 4 weeks	3 or 4 ccs per feeding
4 to 7 weeks	Formula approx. every 4 hours
6 to 7 weeks	Offer Zupreem primate chow (or if unavailable in your area, use dry Science Diet for puppies), fruit, and a couple of small slices of avocado in nest box; feeding amount: at 5 to 6 weeks, the squirrel's intake will rise beyond the weeks of age guidance; give about 6 to 8 ccs per feeding or all the baby wants if the stool remains firm
7 to 9 weeks	Formula 3 times a day plus solid food listed above; add broccoli stem, green beans, and other veggies except corn and sweet potatoes, feeding amount: all they want
9 to 10 weeks	2 times a day; Plus, food above and now add a small piece of fresh corn and a couple small piece of sweet potato, other veggies. Feeding amount: all they want
10 to 12 weeks	Will reject formula during this period; add to food list a couple of almonds or pecans a day, and a small handful of large stripped sunflower seeds.

Tips for success

- Always stimulate the baby to go potty after every feeding. Newly found babies often need to go. Don't be surprised if the baby doesn't have to go since it may be dehydrated.
- Never feed a cold baby and keep baby warm during feeding.
- Let the baby take fluids at a slow and steady rate. If fluids "bubble" out of baby's nose or it appears to yawn, you are feeding too fast! Allowing the baby to aspirate fluids into the lung can result in life threatening aspiration pneumonia.
- Loosely hold the squirrel in a semi-upright position and never feed a baby on its back.

Feeding Position

- Always feed the baby in an upright position in warm conditions with good lighting so that you can monitor the squirrel's swallowing reflex.
- If the baby does aspirate fluids, pull the nipple away from the mouth and while firmly supporting the head and body, with a few gentle rapid forward motions, tip the baby forward to help gravity drain the fluid from the nose, blot the nostrils.
- When the baby is calm and the airways are clear, resume feeding.

Metabolic Bone Disease

Metabolic Bone Disease (MBD) is a deficiency of calcium in a squirrel's diet. It is cause by an improper diet wherein seeds, nuts, and corn are the major, or only, components of a diet. The condition will kill the squirrel. In addition to bone development, calcium is needed for all organic functions, including heart, respiration, blood circulation, muscle, and eyesight. Do not think your squirrel will be the exceptions if you feed a diet composed of seeds, nuts, and corn. This deadly diet is often sold in stored under the descriptor "Squirrel Feed".

Seeds, nuts, and corn are high in phosphorus and contain low, or no, calcium (almonds and hazelnuts do have a small amount of calcium, but also contain phosphorus). The body needs phosphorus as well as calcium, but when the phosphorus ratios exceed calcium rations, the phosphorus blocks the absorption of calcium, making it unavailable to the body. If one feeds a low amount of high calcium foods, and a high amount of phosphorus foods, it will cause MBD. Therefore, calcium foods must be the major component of the diet. Squirrels love nots, seeds, and corn and will eat those foods exclusively if given the opportunity. When these foods are the major component of the diet, they are the nutritional value of candy. When given as small portions of a diet, with high calcium foods being the major item on the menu, seeds, nuts, and corn become just one more nutritional element, in this case a positive one. Again: a diet of seeds, nuts, and corn will cause MBD if they are major, or only, components of a diet.

Symptoms of MBD: general body soreness, activity levels decline, lethargy, sometimes a decrease in appetite, sometimes labored breathing, increasing in severity to seizures and or paralysis, then death if not treated. The symptoms usually manifest around the age of 10 weeks; the caretaker may not see the symptoms or recognize what they are seeing, until the symptoms become severe and the animal goes down. This anguish is preventable is one feeds a high calcium diet.

Treatment for MBD: Get calcium into the squirrel **IMMEDIATELY**. Failure to initiate treatment will kill the squirrel or at the least leave them paralyzed and unfit for release. MBD is treatable if identified at the onset of symptoms. The treatment is calcium. When seizures are present rather than paralysis, the symptoms will stop within a few hours once calcium is given, but paralysis will not correct that quickly, if at all. Even if the symptoms are stopped by the onset of treatment, the animal is still not healthy until their body has absorbed enough calcium to repair the damage and function normally.

Follow these instructions

Administer a calcium supplement containing Vit D (Vit D 3 is best). Vit D 3 makes the calcium more absorbable. In advanced situations wherein, the animal is having repeated seizures or is paralyzed to the point of dragging their rear section, an injection of calcium is needed. The follow up that injection with oral treatments at home. Do not use a vitamin supplement. What is needed is calcium, which is a mineral, not vitamins, but Vit D is necessary and is usually included in calcium supplements because it facilitates the absorption of the mineral.

Dose as follows: for the first 7 days, give about 1/8 tsp or a little less of calcium once a day (crush tablets to powder); for the second week give dosage for 5 days, for the third weeks give dosage for 4 days. A good method of giving the dose is to take a couple of slices of ripe avocado, make some cuts across the pieces, then rub the calcium into the cuts – hand feed. They love avocado and it is good for them in moderate amounts.

During the 4th week, add back into the diet a very small handful of sunflower seeds, a couple of nuts a day, and a small piece of fresh corn (as noted, these foods do have good contributions to make a diet when they are a small part of the diet but must be stopped during the initial treatment). By now, the squirrel's diet should be supplying the nutritional components, including calcium, that they need and the supplement should not be necessary. Give at least one more week for the healing before releasing the baby.

Release

Don't just take it to a tree and let go; the squirrel may reach your back door, begging to come in. That they are begging to come in doesn't mean they are rejecting their birthright: it means they are unfamiliar with the outdoor territory. Squirrels have home ranges in which they know every tree, rock, bush, dog, and cat. Take them to another area and they are completely unnerved and afraid.

Provide an outdoor cage as a support system until they have adjusted to new surrounding and is comfortable outside. The squirrel must learn to interact with its own kind as well as learn about its new environment. Put in the cage outside a week or two prior to your release date. This will introduce the baby to outside temperatures, sounds, and daylight/nighttime schedules gradually. Place the cage in a protected area such as a screened porch, a covered patio, carport, etc. Protect the cage from rain and too much direct sun. Include a wood nest box in the cage so that they baby will have shelter and can hide and continue putting food in the cage every day. It will be very frightened at first and will probably hide in the nest box for a day, but will eventually come out.

Squirrels are not pets

Squirrels are wonderful babies, but can be vicious adults. In most states it is illegal to keep them and if caught, a person could pay a big fine. They have no domestic instincts, they do not love, and they feel no loyalty. They have no pack or herding instincts and are by nature, solitary creatures. Do not allow yourself to confuse their natures with those of dogs and cats. Squirrels have a special dietary and special needs that are difficult to satisfy. Mature squirrels are unpredictable in mood, do not forget or forgive mishandling, and will bite even the hand that cleaned it and kept its bottom cleaned. Do not believe the stored you hear or read which imply squirrels are wonderful pets: they are not. You can have a relationship with a free squirrel that you cannot possibly have in captivity, a relationship that is based on respect and admiration and not on selfish possessiveness.

Baby Harris Antelope and Round Tailed Ground Squirrel
Age and Care

Harris Antelope	Round Tailed
Neonate Born naked. Skin is pink and rather transparent. Cannot crawl Eyes and ears closed. Average weight at birth is 3.6 grams	**Neonate** Born naked. Can crawl on the day of birth. Front legs are more developed than the hind legs. Eyes and ears closed. Average weight at birth is 3.7 grams
One week old Top of the head and back are covered with black pigmentation. Eyes and ears still closed	**One week old** By 4-5 days old have fine hairs on their heads More developed than the Harris antelope during the first week of life. Can crawl, but poorly coordinated and occasionally falls over. Dark pigmentation begins to appear on the back, but the skin is not as dark as in Harris Antelope at same age. Lower, but not upper, incisors are erupting Eyes and ears still closed
Two weeks old Two light stripes are distinguishable on the back. These stripes are covered with white hairs in the adult. The top of head is beginning to be covered with short fine hairs. Eyes and ears still closed	**Two weeks old** The top of head is fully haired, The back is covered with fine hairs and They resemble adults. Eyes and ears still closed
Three weeks old Claws are now well developed Lower, but not upper incisor teeth, have erupted. Cannot walk without falling over. In this respect, they are not as well developed as Round-tailed at three weeks of age. Scrotum of the male is dark in contrast to the rest of the body. Young are very vocal especially when disturbed or handled Ears beginning to open Eyes still closed Fully covered with short hairs, and at this stage resemble adults	**Three weeks old** Fully haired by the end of three weeks Ears have opened. Can crawl now without turning over. Are very vocal, and squeal when handled. Upper incisors are erupting. The eyes open between 3 and 4 weeks of age.
Four weeks old Lower incisors fully erupted, upper incisors beginning to erupt. Still wobbly on feet Between three and four weeks of age, the ears open. Between four and five weeks of age, the eyes open. still nursing but may nibble on solid food once eyes are open	**Four weeks old** Eyes open Can run very well and coordination in walking, climbing, and running has improved. Upper incisors have erupted. still nursing but may nibble on solid foods
Five weeks old Eyes and ears are now open Running and other movements have improved Still nursing but may nibble on solid foods	**Five weeks old** Weaning has started. May still nurse but also nibbling on solid food Fecal pellets change from a yellow to a dark color at the time of weaning
Six weeks old May still nursing but also nibbling on solid foods	**Six weeks old** May be weaned by this age
Seven weeks old + Feces are now dark solid pellets. Weaned and no longer nursing	**Seven weeks old+** Feces are now dark solid pellets. Weaned and no longer nursing.

NEW PATIENT BABIES - SQ fluids must be administered prior to feeding. Once baby warms up feeding can take place.

*****DO NOT HAND FEED A COLD BABY, IT MUST BE WARM TO THE TOUCH BEFORE IT CAN BE FED**

Babies whose eyes are still closed should be stimulated to urinate and defecate before and after every feeding. Failure to do so can cause uremic poisoning. Stimulate by gently wiping the babies genitals with a cotton ball or other soft, absorbent material

Feeding
Feed slowly, let the baby dictate how much. Patience and persistence is key. Some difficult feeders may take 15 mins, easy ones 2-3. Do not get impatient or give up – it is vital that the squirrel gets a decent amount at each feeding. Do not force feed – getting milk in their lungs can be fatal. The baby will stop when he/she is full.

Weaning
Once the eyes open start leaving solids foods. If the squirrel is not ready, it will not eat them. Once the squirrel starts eating solid they will need access to a variety of food in addition to milk and water. (do not stop the milk too soon).

Medical
Baby squirrels that weight under 80 grams will be started on a course of sulfatrim 2x day (7 days to start) and SQ fluids daily. A green med card is needed for both fluids and sulfatrim.

Bat Protocol

Do not handle bats in **ANY** way. *This applies to the daily Medical Services staff as well as Daily Care volunteers.*

Why is this so important? Bats can be rabid. When a bat arrives at Liberty Wildlife, it is usually because it is sick or injured, therefore it is definitely a possibility that it is infected with the rabies virus.

Rabies is a significant public health concern. *In cases where the proper post-exposure protocol treatment was not given, or in cases where it was given too late or incorrectly, rabies is always fatal.*

A person or pet can have "exposure" to the rabies virus from a bite or even from contact with an animal's saliva from a live or dead animal.

The good news is that if post-exposure care is given correctly and on time, rabies is treatable in humans. This is why such care must be taken to track down any possible contact with rabies.

Checking in a bat

When the public brings in a bat, leave it in the container in which it arrived. Put a "Please Check" tag on the container and add the tag that says "Do not touch. Possible rabies." Do not open the container to add food or water. If the public needs their container or carrier, take their name and number and state that we will get it to them as soon as possible. If a Rescue and Transport volunteer has brought in the animal, they may take a temporary carrier until theirs is cleaned and returned to them.

Only authorized Medical Services staff are allowed to assess, treat, or have ANY contact with a bat—this includes bats that are dead as well as those that are alive.

In order to be authorized to work with bats during any medical or daily care procedure, including feeding, an individual must have a current rabies vaccination, proper training, and prior approval from the Medical Services Program Coordinators.

Working with the public

A special form has been designed to obtain additional information from the public when a bat is brought in. The questions on this form are used to track human or pet contact with a bat in the event that it is found to have rabies. Please make certain that every blank on the form is filled in before the public leaves the premises. A copy of the Bat Intake form is included in this section.

It is important to handle this initial interaction with the public with extreme care. Be sure that any inquiries you make are presented in a non-threatening manner.

People may change their answers to questions for the most surprising reasons.

- They might be embarrassed that they touched the animal.
- They might be afraid of contact with state officials.
- They might resent the time, energy, or expense required for them to obtain the necessary post-exposure treatment.
- They might have heard horror stories about medical care.

Children may have an entirely different set of concerns.

- They might be afraid they would be "in trouble"
- They might be afraid of receiving a "shot"

Be pleasant, diplomatic, and professional. If someone has had "exposure" do not berate or frighten them. After you receive the information required, give the person the phone number for the Arizona Department of Health. Explain that the Arizona Department of Health may contact them to discuss any precautions they may need to take.

Definition of exposure

Rabies is most commonly spread through contact with saliva from an animal infected with the virus. Exposure or possible transmission of the rabies virus to a human can take place in several ways. The most common type of exposure occurs from an animal bite. Exposure can also occur as the result of an animal scratch or contamination of mucus membranes or un- intact (open) skin by saliva or nervous tissue from a rabid animal. Exposure can occur from dead animals, too. Rabies affects all warm-blooded animal species, including people. It is 100% fatal in untreated humans.

Again, if a person has been bitten or if it is determined that there may have been "exposure" of any kind, the animal must be tested for the protection of the public.

In cases of "exposure"

If a person has been bitten or if it is determined that there may have been "exposure" of any kind, we will advise the Arizona Dept. of Health so that they can arrange for quick testing of the animal. Remember, in cases where the proper post-exposure protocol treatment was not given or in cases where it was given too late or incorrectly, rabies is always fatal. The animal must be tested in order to save lives.

Testing

The rabies test is done on the brain tissue of the animal. If the animal is alive and needs to be tested, it must be euthanized. Unfortunately, this is the only option and it is the law.

Only authorized Medical Services staff will complete the preparations for testing. Again, if the bat is alive it must be euthanized. The body must be carefully wrapped and triple-bagged.

Bats must be carefully labeled and put in the *medical* refrigerator immediately as their brains decompose quickly. The bat can be either frozen or refrigerated. Although the State can conduct rabies testing locally, additional testing procedures that identify the specific strain of rabies are sometimes completed out-of-state.

Maricopa County Department of Health Bureau of Laboratory Services provides a Rabies Testing Form that must be completed and attached to the specimen. A sample of the correct procedure for completing the form is in this section and a copy is in the file with other blank lab forms. After completing the form, the top part is placed in the outer bag holding the bat.

If there has been "exposure" the animal must be transported to the Arizona Department of Health lab immediately. If this is a routine check, transport it on the same day if possible. At the very latest, it must be delivered within 48 hours.

The testing lab is located in downtown Phoenix on the corner of 17th Avenue and Monroe. Get the directions from Liberty if you are to go down and drop off a specimen. Staff from the testing lab will phone or fax Liberty Wildlife with the results. The lab is open from 8:00 a.m. to 5:00 p.m. and closes promptly on time, in fact, sometimes a little early.

In cases of "no exposure"

If it is determined that there has been "no exposure" the bat will then be assessed and treated according to its condition. If the animal is successfully rehabilitated, it will be released.

If a bat dies or if it is euthanized, it will be submitted for rabies testing as a routine procedure—even in "no exposure" cases.

Remember, the rabies virus is a serious public health concern. Bats are the most common carrier of rabies in Arizona. **Do NOT handle bats in ANY way.**

Liberty Wildlife • Bat Check-in

• Important! Do not touch bats (live or dead) in any way •

Fill in form completely. Please answer every question.

Information on transport person or public

Name _____
Address _____
City/State/ Zip _____
Home phone _____ Work phone _____

Bat information

Species if known _____ Date found _____
Describe where bat was found _____
City _____ Major cross streets _____
Exact address if known _____
Contact name at location _____ Number _____
Was this location a home, school, park, etc.? _____
Describe the site at this location where the bat was found _____
_____

Contact

How did you obtain this bat? _____
_____

Describe your contact with the bat. _____
_____
_____

Did you receive this bat from someone else? (If so, list name and provide phone number.)
_____

List the name and number of anyone else who might have had contact with the bat.
_____

To be completed by Liberty Wildlife

Date In _____ Received by _____
Log Number _____ Assessed by _____

Reptile Protocol

Reptiles are cold-blooded animals with a wide variety of specific nutritional and environmental needs.

Reptiles can carry salmonella. It is important to wash your hands thoroughly after each handling.

Prior to assessing a reptile, identify it if it is safely possible to do so at the time.

Snakes

Do not handle snakes. Unfortunately, today there are so many exotic reptile pet owners and collectors of snakes that you might one day be confronted with a non-native snake that could be deadly. There are also many species of native snakes that are dangerous as well.

Identification of snakes is difficult at times. The demand for "designer snakes" in the pet industry has resulted in animals that have unusual color patterns or markings. Leave the assessment of incoming snakes to the authorized Medical Services staff and veterinarians.

Snakes' skin can easily transfer toxins into the animal. Do not expose them to external products such as Sevin dust, DeSolvIt, or soaps. Rattlesnakes and Coral snakes have their own protocol and will be discussed separately.

Turtles

Turtles are usually thought of as aquatic animals, but this is not always the case! Box turtles require an environment similar to that of a tortoise. Again, species identification is sometimes difficult, but it is critical to providing the correct set-up for your patient.

Tortoises

Tortoises can be very sensitive to their nutritional needs when young. It is critical to provide them with the necessary amount of light and the correct type of food.

Lizards

Lizards have a very thin skin that can easily transfer toxins into the animal. Do not expose them external products such as Sevin dust, DeSolvIt, or soaps.

Gila Monsters

Gila Monsters will be discussed under the protocol for venomous reptiles.

Venomous Reptile Protocol

Snakes

Do not handle snakes. Unfortunately, today there are so many pet owners and collectors of snakes, that you might one day be confronted with a non- native snake that could be deadly. There are also many species of native snakes that are dangerous as well.

Rattlesnakes

Identification of snakes is difficult at times. Did you know that rattlesnakes can lose their rattle? Leave the assessment of incoming snakes to the authorized Medical Services staff. Rattlesnakes can dispense their venom even after they have died. Many people have been seriously injured and even died from contact with a dead snake.

Coral snakes

"Red on yellow, kills a fellow."
"Red on black, friend of Jack."
That's that rhyme for remembering how to identify a venomous western coral snake—just remember to keep ***far* away** while you figure it out!

The venom of coral snakes is highly dangerous. These animals will be treated, fed, and cared for only by authorized Medical Services staff and veterinarians.

Gila Monsters

Although it is rarely fatal to humans, the bite of a Gila monster is tenacious and extremely painful. The Gila monster is one of three known venomous lizards in the world today.

Do not handle Gila monsters. They may seem slow moving, but that is **NOT** the case! Only authorized veterinarians and Medical Services staff will conduct assessments, treatments, daily care, and feeding.

Venomous Reptiles and Snakebite:

A perspective for Wildlife Rehabilitation

By James W. Grier
Fargo, ND

Introduction

There are four situations in which a wildlife rehabilitator might encounter venomous reptiles or have to deal with an actual or potential snakebite.
(1) An injured or diseased individual of a venomous species of reptile could be brought in for treatment and care as in other types of wildlife cases.
(2) A Wildlife rehabilitator, in the course of being outdoors to recover, release, or otherwise work with another rehabilitation case could accidentally encounter a venomous reptile.
(3) A wild animal suffering a snakebite could be brought back in for treatment.
(4) Although not involving a legitimate "wild" animal case, it is possible that someone might bring captive venomous reptile to a wildlife rehabilitator for help.

This article will give a brief background on venomous reptiles, snakebite, and discuss ways of dealing with the possible encounters that wildlife rehabilitators could experience.

General Background on Venomous Reptiles

Venomous reptiles fall into two categories: venomous lizards and venomous snakes. There are only two truly venomous lizards, the Gila monster (Heloderma suspectum) and the Mexican beaded lizard (H. borridum) in the family Helodermaidae. They are found in the deserts of Mexico and southwestern U.S. In addition, the Komodo dragon of Indonesia, while not actually venomous, is venomous-like in that its mouth contains a complex of harmful bacteria that can create serious infections through a bite. All of these lizards are unlikely to be encountered by a "wildlife rehabilitator", or, in the event that they might be, the persons who would most likely be involved would probably already be at least somewhat familiar and able to recognize and deal with these animals. The remainder of this article will focus on the more widespread category of venomous snakes.

There are an estimated 8,000 persons bitten by venomous snakes annually in the United States alone. However, fewer than twenty people die each year in the U.S. Although the possibility of dying form a snakebite seems frightening, the chance of it happening is quite low, even if one is actually bitten. The chances of surviving, or avoiding in the first place, a snakebite are even better if one is informed.

There are three main type of venomous snakes: the front-fixed fanged elapid snakes (family Elapidae); the front-folding fanged vipers (family Viperidae); and rear-fanged snakes (family Colubridae, the common and generally harmless snakes). The viper's fangs are longer than the others and fold back against the roof of the mouth when not in use. The elapids have much shorter fangs but the venom tends to be much more potent and toxic. Aside from the boomslang of Africa and a small number of tropical species, the rear-fanged snakes are insignificant and not considered dangerous to humans, although some, such as the hognose snakes, can give a painful and toxic bite similar to a bee sting.

The venom varies among different species (and sometimes even among different populations or in individuals within a given species) of venomous snakes; it is a complex mixture of substances in all cases. The variability in the venom of different snakes leads to a wide variety of symptoms that are difficult to generalize. There are two basic categories of effects and symptoms: local, which include such things as pain, swelling, and bleeding at the site of the bite and in surrounding tissues, and systemic, which include problems with respiration, the heart, nervous system and senses, internal bleeding, and hemorrhaging at distant sites around the body such as in the victim's mouth. All types of venomous snakes can produce both categories of effects and symptoms. And there are varying degrees of seriousness depending on species of the snake and a host of other factors. However, as a rough generalization, viper bites tend to be more local and painful, produce swelling, and be less life threatening whereas bites tend to produce more systemic effects, little or no swelling and pain at the site of the bite, and be more life-threatening.

Except for the coral snakes and a few insignificant rear-fanged species of the southern states, all of the venomous snakes of concern in the United States are vipers. These include a number of species and subspecies of rattlesnakes plus copperheads and cottonmouths. One should refer to a reptile field guide to determine which, if any, venomous snakes might be encountered in any particular area.

Snakes use their venom primarily for subduing prey and as a digestive aid. It is used only secondarily for defense, such as against humans. As such, they bite differently in defense than they do when eating. In some cases, perhaps twenty percent of the time, they do not even inject venom when biting defensively. In another thirty or so percent of the time, they inject only a small, insignificant amount of poison. The instances of little or no envenomation are known as "dry bites". Significant doses of venom are delivered in roughly half of all defensive bites. How serious it is to one's health depends on a number of factors (such as where the bite is and the person's age and health).

The 2-3-4 of Snakebite

Avoiding or Minimizing the Chances of Being Bitten

The best way to avoid problems is not to get bitten in the first place! There are two basic rules:

1. When in areas with venomous snakes, always be alert and cautious. It helps to know what might be around, by checking with local or regional reptile guidebooks, then be careful when in the field, such as when hunting, fishing and camping, gardening, or otherwise being outdoors.
2. Don't deliberately handle or otherwise meddle with venomous snakes, including attempts to kill the snake. Handling of snakes should be left only to experts with training and previous experience. It is best to just look at, and even admire the snake but keep your distance. It is usually a rare opportunity that many people fear but many others actually hope for. (Rattlesnakes, for example, are not found in most parts of the world-some people travel to the U.S. just to get a chance to see them!)

Venomous snakes can be fast and unpredictable. Never assume that they will not try to strike but always assume that they might including at a surprising moment when you least expect it. The only safe way to deal with a venomous snake is to know where the head is and don't give the fangs a chance to touch you. For everyone except experienced snake handlers, that means staying back away from and not touching or messing with it, even with a stick or other object. And unless it is a near human habitation, don't kill or attempt to move it. Just enjoy the sight then you go your way and let it go its way.

What Should Be Done in Case of Snakebite

The three most important things to do in case of a bite does occur are:

1. Remain as calm as possible. Bites are usually not as serious as people fear. Even if they are serious, getting excited only complicates the situation. What is needed is concern and prompt attention, not fear and panic.
2. Get to a physician/hospital as quickly and safely as possible. If a telephone is convenient, call in advance to alert them that you are coming. There is little else that one can or should do in the way of first aid (see below) and many of the things that untrained people try to do only make matters much more serious -- often creating greater problems than the bite itself! The main emphasis for first aid should be on safely getting the victim to medical treatment rather than "doing something" in the field. The bitten person should be kept calm as possible and move (or be moved) to medical help deliberately with a minimum of activity. One should make haste slowly to the closest medical facility. The best first aid kit for snakebite is a set of car keys!
3. Remember the following name: Arizona Poison Information Center. Many medical and poison control centers in locations where venomous snakes exist have information and experience on what to do for snakebite. However, one of the biggest problems with snakebite is that it really is not a problem -- that is, it is so rare that most medical personnel never encounter it, have little training or understanding concerning it. and consequently, do not know what to do when it occurs. Thus, it may be important for you to know who to have them contact for advice! The Arizona Poison Center, located at Tucson, Arizona, is a national referral center providing advice for physicians and hospitals. The phone number (24 hr.) is 602-626-6016. It is easily obtained by calling the Arizona information operator.

When the medical facility is called in advance or upon entering, inquire whether they have much previous experience with the snakebite and ask them to contact Arizona Poison Information Center.

What Should Not Be Done in Case of Snakebite

In spite of being recommended in the past, several actions may only create worse problems and they are no longer advised by most experts. In particular, the following four things should NOT be done:

1. Do NOT give alcohol to the victim. Alcohol is frequently involved in situations where people get bitten in the first place. Alcohol and venomous snakes mix even less well than drinking and driving.
2. Do NOT cool the bitten area.
3. Do NOT use a tourniquet. Tourniquets have been a leading cause of medical problems in dealing with snakebite. It is better to do nothing than use a tourniquet. There is good evidence that in case of elapid bites, a broad, elastic wrapping, such as with a broad medical wrap or a spread-out nylon sock, wrapped around the entire limb including covering the bitten area, may help until one can get proper medical treatment. But broad wraps have not been well studied for viper bites; viper bites usually lead to swelling (unlike most elapid bites) which can create dangerous pressure under any form of constriction; and most persons will never see an elapid bite. If in doubt, don't. And in any case, broad wraps are much different than tourniquets. Don't use tourniquets!
4. Do NOT cut into the bitten area. The old incision and suction method is no longer generally recommended for most cases of snakebite, although there is still some difference of opinion on the matter. Unless it is done by someone with formal training and proper equipment, and is initiated immediately (within a maximum of five minutes of the bite), it is ineffective and can be much worse than the bite itself. Suction over the bite may help if a proper device (such as the Sawyer Extractor --see references at the end) is available and it is started immediately. The mouth should not be used and most "snakebite kits" available at sport shops, etc. are worthless. Since proper devices are rarely at hand quickly enough when needed, suction also is usually not worth considering.

Venomous Snakes and Wildlife Rehabilitation

Now to return to the circumstances in which wildlife rehabilitators might encounter venomous snakes, as indicated at the start of this article. The different situations and recommended responses are very different from each other.

A venomous snake at the door

It is extremely unlikely that a venomous snake will be brought to a rehabilitator for treatment and care. Most cases where injured or diseased venomous snakes might be found in the wild would result in the snake being left alone or killed by whomever found (or injured) it in the first place. Secondly such cases are not likely to respond to rehabilitation regardless of one's good intentions. Nonetheless, I suppose that there is a slim chance that such a case, or an animal that was being kept in captivity by someone could show up on a rehabilitator's doorstep. If you are faced with such a situation, my recommendation is to leave it alone and contact someone for help and advice. The snake, if not already in a secure, hard walled container, should be placed into a container such as a plastic box or garbage can. If it is in a bag, place the bag in the container. Be aware that snakes can easily bite through bags! The snake (or bag) should be moved only with long tongs, a hook, stick, rake or similar item—*not by hand, even with gloves,* or otherwise allowed near any part of one's body. Only someone who is already trained and experienced in working with venomous snakes should work with them. If you are such a person, then you already know what you are doing and this information is superfluous. If you are not such a person, don't mess with the animal! Proper training requires more than can be obtained from reading: it requires previous work with nonvenomous species, working with someone else who is experienced, and practice with live animals.

To know what venomous snakes might occur locally, I recommend referring to a good field guide, available in most book stores, or contact your local or state natural resources agency. If in doubt about whether a particular snake is venomous or harmless, do not take any chances, leave it alone.

Who does one turn to for help in case of a venomous or questionable snake at hand? Most law enforcement agencies, veterinarians, universities, etc. lack the necessary expertise unless, by chance, there happens to be an individual with the interest and experience on board. Your best bet is to contact (call information for phone numbers) Black Hills Reptile Gardens in Rapid City, SD, or a major zoo and ask for the herpetological department. They might be able to help you directly or else refer you to one of the few snake veterinarians around the country who are qualified to help in such matters.

Exposure to venomous snakes while in the field

If you happen to accidentally encounter a venomous snake while engaged with other rehabilitation activities, simply follow the "2-3-4"s described earlier in this article. Be alert to the possible presence of venomous snakes if in an area where they exist and don't mess with them. Leave them alone. Give the snakes a wide berth; go on about your business; and it will go on about its business.

Wildlife brought in as a victim or possible victim of snakebite

Small animals such as rodents, rabbits, small birds, etc. are not likely to survive a snakebite. Such a case brought in for wildlife rehabilitation probably represents someone interfering with a snake's lunch! Incidentally, most species of vipers quickly bite their prey and let it go. They wait for it to die then track it down by olfaction to recover and eat its prey. Snake bites on small animals, while common, result in quick death, and the animal is usually consumed in relatively short period of time so that they are unlikely to be found in the wild by a person.

Larger animals, such as domestic species or wildlife like deer, however, may occasionally be found suffering from snakebite. They symptoms are not always clear and the fang marks are unlikely to be seen or even found upon close inspection. There may be bleeding from a limb, the face region, or perhaps another part of the body surface. The most likely symptoms will be swelling and tenderness from pain. If on the nose, face, or throat, there may be difficulty with breathing.

Treatment might require antivenom, if worth the expense and trouble. This will require obtaining antivenom (most hospitals in regions with venomous snakes carry it, as do some veterinarians), and getting advice on how to administer it. Antivenom treatment is expensive, complicated (involving intravenous techniques), and must be started soon (a few hours maximum) after the bite to be effective.

Alternatively, and often just as effectively, treatment may consist of providing quiet and rest; with time for recuperation (usually only a few days) by letting the animal's body itself handle the venom. During the first few hours, constant vigilance of the victim is required with standby preparations in case of respiratory problems or necessary fluid replacement.

Conclusions

Snakebite is not a common problem (except for normal prey species) and the vast majority of wildlife rehabilitators are unlikely to ever encounter anything involving venomous snakes or snakebite. The few circumstances under which such encounters might occur are varied and require very different responses, as discussed in the article.

The most important advice for persons who are not already trained and experienced in working with venomous reptiles is don't! In other words, don't handle, get near, or attempt to deal with them. Instead make sure they snake is left alone, if in the wild, or, if at the door, in a secure hard-walled container or otherwise not posing a threat to anyone and seek help such as from the herpetologists at a zoo. If in doubt as to whether a snake is venomous or not, regard it as a possibly venomous and leave it alone.

References

The primary reference for snakebite and dealing with it is:
F. E. Russell. 1983. *Snake Venom Poisoning*. Great Neck, NY; Scholium Int, Inc (This is the most definitive current book on the subject covering both North American and, to a limited extent, exotic species. It discusses medical aspects in depth.)

Equipment

The "snakebite kit" considered to be most effective for reducing venom in a bite from a viper is a syringe pump suction device, the Sawyer Extractor. Instructions that come with the kit explicitly and emphatically recommend NO cutting around the bite. Also, the kit is NOT a substitute for proper medical treatment; it is only an aid to possibly reduce the amount of venom that may be present. The kit is available for about $15 from Sawyer Extractor Kit, Saffeta Inc., P.O Box 7036, Long Beach, CA 90807. Anyone routinely working with or around vipers might want to keep one of these kits close at hand.

James Grier has been a professor in the Department of Zoology at North Dakota State University since 1973. He first became interested in snakes in 1946 (at the age of 3) and started working with venomous snakes in 1962. He maintains a collection of around sixty-five snakes of which about
half are venomous, at the university.

Pelican Protocol

Used by Sea World

- A bird below 2.5kg (2500g) should be given Sub q fluids for a few days
- Give the fluids in the region just above the femur (in the apterium area) in the pocket of tissue that you can pinch and tent up. The process is fairly easy, you just have to be really sure that you pull back on the syringe and not have air.
- Give 150cc of an electrolyte solution twice daily PO. Use Hydolyte or Pedialyte.
- Give an injection of B complex 150 at a dose of 0.2ml per bird and E-Selenium at a dose of 0.4mls per bird. Can combine into a syringe and do one IM injection. This is given once per week and the very poor condition birds may get a shot for a series of 4 weeks. Most only get it once or twice.
- Administer an oral dose of dilute Ivomec to help with the parasites.
- Do not feed the pelicans in the first 24 hours. Hydrate with the electrolyte solution and administer sub q fluids.
    - Sea World warns against feeding too much to start out because they have found that ion these pelicans they tend to bottom out in their electrolytes after a few days of eating their fill of fish. They go from an anabolic to a catabolic state. They are not sure why but it even affects the pelicans that are not as thin. The pelicans that are super thin will feed gruel from Mazuri or Emeraid that are products for marine animals. They will feed 100-200 calories a day and double the second day to avoid the electrolyte shift.

Cottontails and Jackrabbits

Cottontail babies are born blind, naked, and helpless; jackrabbits are born furred and with their eyes open; they can move around just a few hours after birth




Cottontail Baby

Newborns (cottontail On top / jack on bottom)


Jackrabbit Baby



Adult Cottontail

Adult Jackrabbit

Adults – side by side comparision

Adult Cottontails are small weighing 1 to 2 pound, while jackrabbits are quite large, weighing up to 10 pounds and standing just under 2 feet tall.

Lesser Goldfinch and Verdin

Juvenile Verdin

Juvenile and Adult Verdin

Juvenile Verdin

Juvenile and Adult

Lesser Goldfinch

Verdin

Lesser Goldfinch

The lesser goldfinch adult grows to 3.5 – 4.7 in
The Verdin adult grows to 3.5 – 4.3 in

Lesser Goldfinch juveniles and females have olive backs, dull yellow underparts, and black wings marked by two whitish wingbars.
Adult males are bright yellow below with a glossy black cap and white patches in the wings; their backs can be glossy black or dull green. They have a black tail with large, white corners

Verdin juveniles are Plain gray, including face. Base of bill pinkish yellow.
Both male and females adults have a gray body and yellow face

White Throated Swift

Baby Bird Identification

Hatchling (newly hatched)
Nestling (too young to leave the nest)
Fledgling (can walk around, leaves the nest and fledges to the ground)
Juvenile (teenager/young adult)
Adult (fully mature)

Grackle hatchling

Grackle nestling

Kingbird

Grackle fledgling

Grackle and Cowbird

Cowbird (bigger one) next to wren – Cowbirds have a distinctive red mouth

Cowbird Fledgling

Starling Hatchling

Starling Nestling

Starling Fledgling

Starling Adults

Thrasher hatchling

Thrasher nestling

Thrasher fledgling

Thrasher Juvenile

Morning Dove hatchling

Morning Dove nestling (note the white tip on the beak)

Morning Dove Fledgling

Morning Dove juvenile

Inca Dove hatchling

Inca Dove nestling (note the brown color)

Inca Dove fledgling

Inca Dove juvenile

Morning Dove / Inca Dove

White Wing Dove Hatchling

White Wing Dove nestling

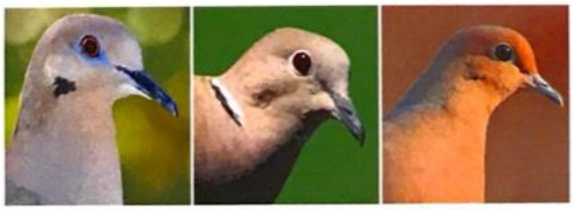
White Wing Dove Fledgling

Adult and juvenile

Eurasian Collared dove

White Wing, Eurasian Collard, Mourning, Inca

**Eurasian Collared doves, also called Ring Neck Doves are an introduced species that are not protected under federal law. They've become quite common in the Phoenix area over the past few years



White Winged, Eurasian Collared, Morning Dove

Pigeon hatchling (note the yellow coloring)

Pigeon nestling

Pigeon fledgling



The House Sparrow is born naked without any fuzz

House Sparrow progression


House Sparrow nestlings


House Sparrow fledgling and juvenile


House Finch Fledgling and juvenile



Hatchling House Finch is covered in a down that looks like dandelion fuzz

Nestling – notice the fuzzy head

Fuzzy down head and an underbelly with a very striped appearance are characteristics of a juvenile finch.

Male and Female House Finch

Female and Male House Sparrow



Towhees

Killdeer

Mockingbird hatchling

Mockingbird Nestling

Mockingbird Fledgling

Mockingbird Juvenile

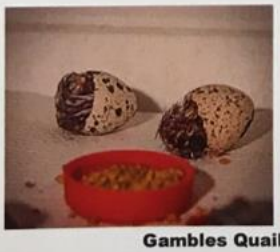
Cactus Wren hatchling

Cactus Wren Nestling


Lovebird


Hummingbird hatchlings

Hummingbird nestling




Gambles Quail hatching

Gambels Quail hatchling

Gambels Quail babies

Gila Woodpecker hatchling

Gila Woodpecker nestling

Gila Woodpecker Fledging

Top – Gila Woodpecker / Bottom – Gilded Flicker

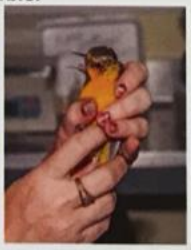
Acorn Woodpecker

Fledgling King Bird

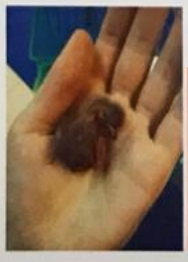
Yellow Warbler

Lucy's Warbler

Yellow Grosbeak



Bullocks Oriole



Say's Phoebe



Green Heron



Black Crown Night Heron



Great Blue Heron


Least Bittern


Grebe


Cattle Egret

Great Egret


Commorant



Screech Owl



Elf Owl

Flammulated Owl



Burrowing Owl



Great Horned Owl




Barn Owl



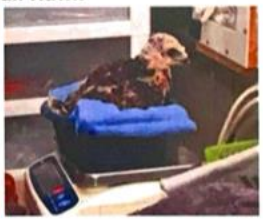

Coopers Hawk




Red Tail Hawk

Juvenile and adult






Harris Hawk

Goshawk




Sharp Shinned Hawk

Swainson's Hawk




Prairie Falcon

Peregrine Falcon


Kestrel

Girl (brown) / Boy (gray)



Roadrunner

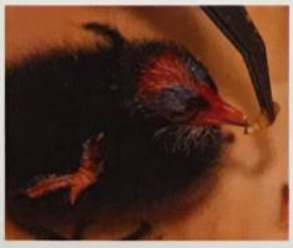


Raven

Black Vulture

Turkey Vulture

Osprey



Moorhen

Adults have black back, wings, and tail.White throat, belly, and sides of rump. Body is cylindrical. Wings are long, pointed, and swept back. Juveniles are similar to adult, but duller



Swift


Swallow

Cliff Swallow

They have metallic, dark-blue backs and pale, pumpkin-colored rumps. They have rich, brick-red faces and a bright buff-white forehead patch like a headlamp. Some juveniles show whitish throats in summer and fall.



Ash Throated Fly Catcher

Adults have a long rusty tail and short, bushy crest. They are back brown with a pale gray throat and chest. The belly is pale yellow. Juvenile similar to adult, but paler, with buffy tips to wing feathers, and more reddish brown in tail.



Lesser Nighthawk

Nighthawk **Poorwill**

- Nighthawks have longer, thinner wings with a white bar across the tip, and a longer tail.
- Poorwills have more pronounced bristles extending laterally from the base of the bill

Common Poorwill

Juvenile Turkey Vulture or Adult Black Vulture?

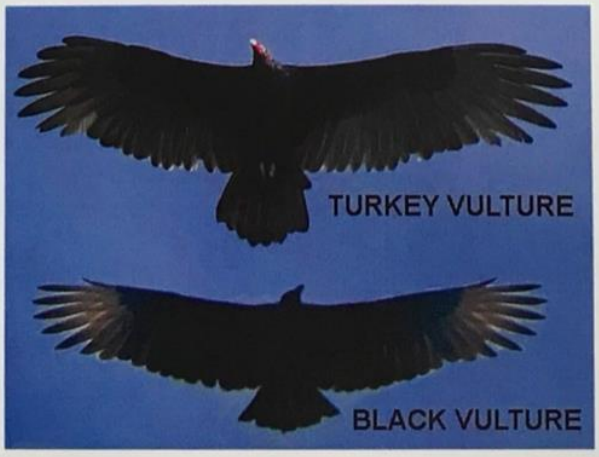
Juvenile Turkey Vultures take 2 years to develop their adult coloration. Birds less then 1yr old have distinctly browner cast to their body plumage. Their heads are the color of soot and covered with fine brown fuzz. The wrinkles, wattles and warts that individualize The adults aren't present in young birds. The neck ruff lacks the irridescense of adult birds. The beak is dark with an ivory base. As the bird passes it's first birthday the head turns pink and the beak turns a two tone cream with a dark tip.

Juvenile Black Vultures are similar to adults but have black heads rather than the gray heads of the adults. Their heads lack the wrinkles of the adults and are covered in soot covered down. The beaks are dark without a pal tip. The dark body plumage lacks the sheen of the adults

Juvenile and adult Turkey Vulture

Juvenile

Black Vulture

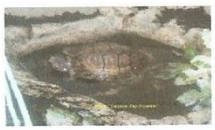


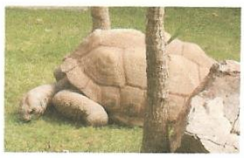
Raven or Crow?

	Crow	Raven
Feathers	Less shiny, may have lighter markings	Shiny and wet sheen
Bill	Smaller and flat. There is no tuft of hair atop the bill.	Bigger, more powerful and curved. There is a tuft of hair atop the bill.
Size	Smaller; the size of a pigeon; 17 inches long (approx.); weight around 20 oz	Larger; almost the size of Red-tailed Hawks; 24-27 inches long; Weight around 40 oz
Wings	Blunt and splayed; wingspan 32 to 40 inches	Pointed wings; wingspan 46 to 54 inches
Life span	8 years	30 years
Adaptive skills	Like being in human populated areas; more social and audacious	Drawn to carrion cattle and sheep; less social, more cautious
Vocalization	Caw- Caw; nasal, high pitched call	Gronk-Gronk, croooaaak; low and hoarse
Habitat	Northern AZ, tend to stick to elevations between 5,200 and 9,500 feet	Widespread through all of AZ
Tail	Fan-shaped	Wedge-shaped

Identifying Common Turtles & Tortoise in the United States

by JoAnn Dalcin

Comman Name	Range	Shell or Markings	Length	Additional Information
Turtles This group consists of land and water turtles. The most common and easily recognized land turtle is the Box turtle. Captive Box turtle diets consist of worms, some fruits, and canned moist dog food. These turtles do not swim well, but do need a container with about 1" of water in their containment area.				
Eastern Box Turtle	Maine to Georgia, Atlantic Ocean to Alabama	Dark brown or block with irregular yellow or orange lines 	4-8 "	
Three Toe Box Turtle	Georgia to Texas	Light brown w/dark lines 		
Ornate Box Turtle	Norther: Nebraska to South Dakatoa & Illinois Southern: Western Texas to Southern Arizona	Dark with yellow lines 	4"	
Gulf Coast Box Turtle	Coast of Georgia & Florida		7-8"	
Florida Box Turtle	NE Florida to SE Georgia	Dark Brown or black with radiating yellow streaks 	5-6"	

Chinese Box Turtle		Dark brown or black top of head is olive, sides are yellow or orange 	About 7"	
Malaysian Box Turtle	Thailand, Malaysia, Vietnam	Moderately domed dark brown or black, yellow lines on the face, under shell is yellow 	About 8"	Most aquatic. Will eat fruit, canned moist dog food and some smelts (fish)
Tortoise Have Elephantine feet. Any tortoise found her could be an escape from someone's house as they can live here. In t he wild they eat grasses. As a pet feed them greens (kale, endive, red or green leaf lettuce), some fruits (sparingly), and mixed vegetables. All tortoises need a good vitamin supplement.				
Desert Tortoise	SE California, Western Arizona, Southern Nevada, & SE Utah	Brown shell 	11"	A protected species in Arizona, California & Nevada
Texas Tortoise	Texas to Mexico	Light brown shell 	6-7"	
Gopher Tortoise	Gulf Coast of Florida	Flattened or elongated light brown shell 	9-10"	

Water Turtles

Are identified by their smooth shells and sebbed feet. The most common seen in the pet trade are the sliders, painted and the yellow bellies. Turtles in this grouip can also be recognized by the red, yellow, or orange horizontal stripes on their face, neck or limbs and a crescent or spot beyind the eyes. These turtles are found over much of the U.S., Mexico, Central America to the NW corner of South America. They are herbivorous and omnivorous. Males are usually smaller than the females. They average from 3 inches (Muhlenberg) to 2 feet long (Batagus). Most species inhabit fresh water, but spend many hours backing on logs. Another group of water turtles are the mud and musk turtles. Their shells are more domed and they average in length from 4-7 inches long. They enjoy diets of insects, fish, mollusks and some vegetation.

Mud Turtle	Over most of the U.S. but generally the SE U.S.	Yellows to brownish or a cmbination, some have yellow lines on their faces 	3-5"	
Musk Turtle	Maine to Wisconsin and as far South as Florida	Brown or black 	About 5"	a.k.a. stinking jim or stinkpot. This turtle loves water.

Turtles and Tortoise Identification

Desert Tortoise

- Desert tortoises live approximately 80 – 100 years
- They attain a length of 10 to 14 inches with males being slightly larger than females.
- They can range in weight from 24 to 51 lbs
- Their shells are high-domed, and greenish-tan to dark brown in color. The front limbs have sharp, claw-like scales and are flattened for digging. Back legs are skinnier and very long. The front limbs are protected with a covering of thick scales.
- They grow slowly and generally have low reproductive rates
- The Desert tortoise is an herbivore
- Population in some areas have declined by as much as 90% since the 1980s
- Primarily diurnal and crepuscular but occasionally active into the night. The Desert Tortoise is entirely terrestrial
- It is illegal to touch, harm, harass or collect wild desert tortoises.
- It is illegal to release a captive desert tortoise into the wild. Also, it would be detrimental to wild populations because it can spread disease and disrupt uniquely adapted genetics in wild Tortoises. You may adopt a desert tortoise if you are a permanent resident of Arizona.
- Their most active time is in the spring when they will forage for food.
- They can store water in their bladder and can go for long periods of time without food or water.
- Desert Tortoises do hibernate.
- Dehydration is a significant risk during hibernation therefore all torts are soaked daily in the weeks prior to hibernation
- Females lay 4 to 8 ping-pong ball sized eggs at one time. usually in June or July. The eggs then hatch in August or September.
- The desert tortoise is found in eastern California, southern Nevada, southwestern Utah, western and southern Arizona, and Sonora, Mexico.

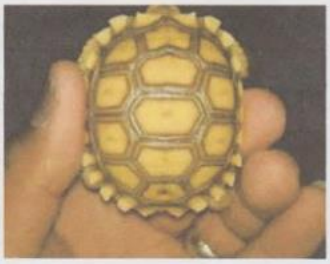
Red Eared Slider

- Older sliders can lose most or all of their colorful markings
- Red-eared sliders are almost entirely aquatic
- It is the most popular pet turtle in the United States and is also popular in the rest of the world.
- It is native to the southern US and northern Mexico, but has become established in other places because of pet releases and has become an invasive species in many areas.
- Get their name from the small red dash around their ears. The "slider" part of their name comes from their ability to slide off rocks and logs and into the water quickly.
- They can live 50-70 years.
- Sliders are omnivores and while they may eat lettuce they prefer protein such as worms and minnows
- They do not typically hibernate

Sulcata Tortoise

- Also known as the African spurred tortoise it is native to Africa.
- The third-largest species of tortoise in the world.
- Can live more than 70 years.
- Grow rapidly for the first five to 10 years, and then slows
- Adults weight can weigh up to 200 lbs
- Adults measure from 24-36 inches long
- They DO NOT hibernate during the winter
- They are herbvivores
- The carapace (top shell) is tan to yellow in color in the center of each. Each scute is outlined by brown growth rings. The plastron (bottom shell) is light tan to yellow in color with no markings. The skin is very thick and the legs are covered in dull, spine-like projections. There are prominent spurs on the rear legs.

Babies - Sulcata or Desert Tortoise???



Sulcata

Desert Tortoise

Leopard Tortoise

- Fourth largest species of tortoise in the world.
- They are from Africa
- Adult measure from 16 - 28 inches long
- Adults weight can weigh up to 120 lbs
- They live between 50 and 100 years
- Leopard tortoises do not hibernate
- Leopard tortoises are herbivores
- The leopard tortoise is a brightly colored, high-domed, medium-to-large tortoise. It has been popular in the pet trade for many years
- The skin and background colour are cream to yellow, and the carapace is marked with black blotches, spots or even dashes or stripes. In mature adults the markings tend to fade to a, nondescript brown or grey

Spur-thighed tortoise or Greek tortoise

- Often confused with Hermann's tortoise However, notable differences enable them to be distinguished.
- Has visible spurs on each thigh which the Hermann's does not have
- They are not native to the US
- Adults range from 6 – 7 inches in length
- Because there are so many subspecies of the Greek Tortoise, the appearance varies widely. Color can range from olive with dark spots in the middle of each scute to a golden variety that is almost all yellow in color.
- In all subspecies, the male is smaller than the female
- They are herbivores
- Dark central fleck on the underside
- Large scales on the front legs

Russian Tortoise

- Adult measure from 5 – 9 inches long
- A popular pet tortoise, they are one of the most readily available tortoise species in the USA
- Territorial and can be aggressive towards others of their kind
- Leopard tortoises do not typically hibernate
- Leopard tortoises are herbivores
- Russian tortoises can live from about 40- 75 years.
- They are generally brownish black in color with lighter patches of yellow between the scutes of the shell. Underneath the shell the body is bright yellow and brown
- Not native to the US

Red-footed tortoise

- Adults range from 12 – 16 inches in length
- Have a dark-colored loaf-shaped carapace (back shell) with a lighter patch in the middle of each scute, and dark limbs with brightly colored scales that range from pale yellow to dark red.
- They are herbivores
- Native to South America

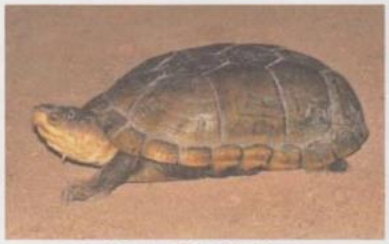
Hermann's tortoise

- Adults range from 5" – 10 inches in length
- They are herbivores
- May have attractive black and yellow-patterned carapaces, although the brightness may fade with age to a less distinct gray, straw, or yellow coloration. They have slightly hooked upper jaws and, no teeth, just strong, horny beaks. Scaly limbs are greyish to brown, with some yellow markings, and their tails bear a spur (horny spike) at the tip.
- Two black bands on the underside
- Small scales on the front legs
- Not native to the US

female male

- Box Turtles live between 40 and 100 years
- Adults measure from 5 - 8 inches long depending on the species
- Box turtles are mostly omnivores with some being primarily carnivorous
- Box turtles do hibernate
- They have sharp horned beaks and hinged plastrons
- Primarily diurnal. Often active in the morning or during rainy conditions. Primarily terrestrial but capable of swimming. Often seen wading in shallow puddles
- Mates in spring and fall and buries a clutch of up to 8 eggs in a shallow, moist nest within well drained soil. Females are capable of retaining the eggs until conditions are right for nest building
- Box turtles are popular pets however they one of the most difficult species of turtles to successfully care for in captivity. Three Toed Box Turtles are often considered the best species to keep as pets since they are hardy and seem to suffer less from being moved into a new environment
- Only Ornate Box Turtles are native to Arizona and are protected . It is against Arizona State law to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect this animal or to attempt to engage in any such conduct.

Mud Turtle



Arizona Mud Turtle

Sonora Mud Turtle

Yellow Mud Turtle

- The yellow mud turtle has a brown to yellowish-brown, flattened carapace and a yellow plastron. The neck is yellow or cream and has small tubercles
- Have hinged plastrons but unlike box turtles they cannot close themselves completely
- In Arizona, the yellow mud turtle is limited to the extreme southeastern corner of the state,
- The Sonora mud turtle has a keeled, olive-brown carapace. The throat and neck are brown with yellow reticulations and there are prominent tubercles under the chin.
- The Sonora mud turtle has the most extensive range of the three mud turtles in Arizona.
- The Arizona mud turtle has a yellowish-brown carapace and a yellow plastron. The neck and throat are yellow or cream, and the neck has small tubercles. It is limited to south-central Arizona and extreme north-central Mexico..
- The Arizona mud turtle is limited in Arizona to the south-central part of the state
- The feet are webbed.
- One thing that separates them from other species of turtles is that the first and second marginal shield do not connect.
- Primarily diurnal in spring and fall but can be active at any time of the day or night.
- Aquatic, but may be seen on land traveling between bodies of water They do hibernate in an underground burrow
- Primarily carnivorous
- Adults are 6-7 inches in length
- Life span is from 6 to 10 years age.

Box Turtles

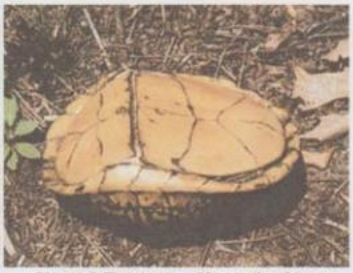
Desert

Ornate

Ornate (left) and the Desert (right)

Three Toed

Eastern



Closed Eastern – Note the hinge

Ornates –eye color and the male has more colorful markings on the legs

Spotted

Florida

Gulf Coast

Chinese Golden

- Box Turtles have a domed shell, which is hinged at the bottom, allowing the animal to close its shell tightly.
- The females have yellowish, brown eyes and the males have red or orange eyes.
- The plastron on males has a concave area centered beneath the hinge while the female is flat. The male has a shorter, thicker tail
- There are about 21 different species of Box Turtles including 10 being exclusively from Asia.
- There are two subspecies of the Western Box turtle - the Desert box turtle, and the Ornate box turtle. They are similar in appearance however, the desert box turtle is more yellowish in color.

Arizona's Common Captive Turtles

Shell is soft | Shell is hard

Shell is spiky | Shell is smooth

Tail is much shorter than length of shell | Tail about as long as length of shell

1 Keel | 3 Keels

Bottom shell has a hinge | No hinge on bottom shell

Shell has a ridge or keel | Shell DOESN'T have a ridge or keel

All four feet are webbed | Feet are NOT webbed

One Hinge | Two hinges

NO red stripe on head | Red stripe on side of head

Four toes on front feet | Five toes on front feet

Hind foot has 4 or 5 Toes | Hind foot has 3 Toes

Shell is more flat | Shell is more domed

One enlarged scale on each hind leg | 2 or 3 enlarged scales on each hind leg | Hind leg covered in small scales

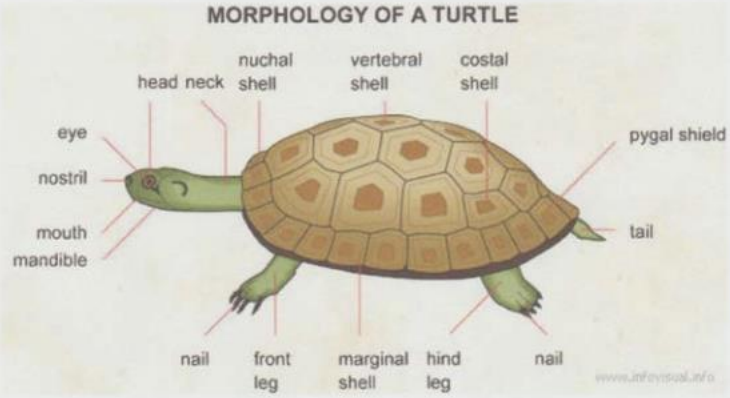
Shell has solid color | Shell has black patterns

Stripes on shell | Blotches on shell

*Due to high variability in coloration and shape, this is only a general guide to identification

Turtle Anatomy

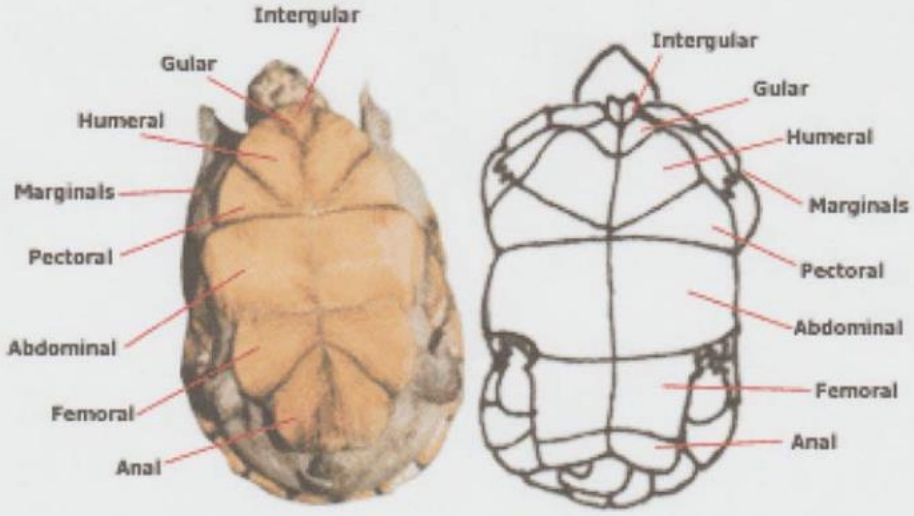
Under the turtles shell is a fairly complex and fascinating structure. This structure has obviously served them well as the earliest known turtles date back to 220 million years ago, making them one of the oldest reptile groups. Turtles have been around longer than lizards, snakes or crocodiles.

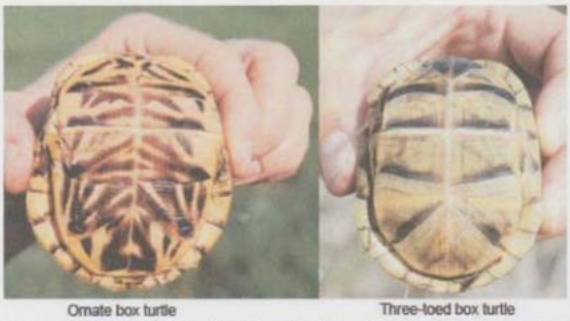


Turtle Shell

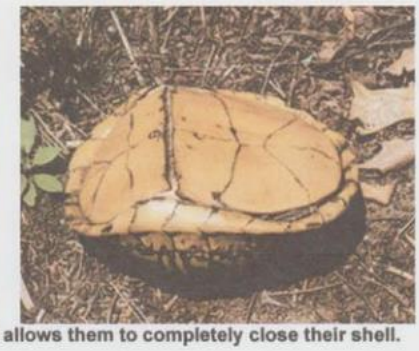
The shell plays a vital part in protection and is divided in two parts. The upper shell is called the carapace and the lower shell is the plastron

Plastron (lower shell)





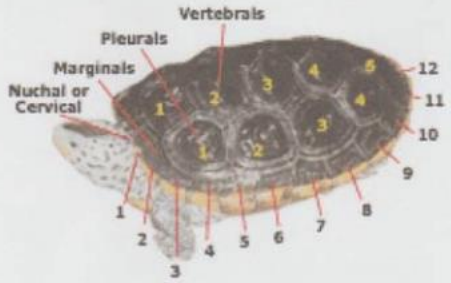
Ornate box turtle Three-toed box turtle

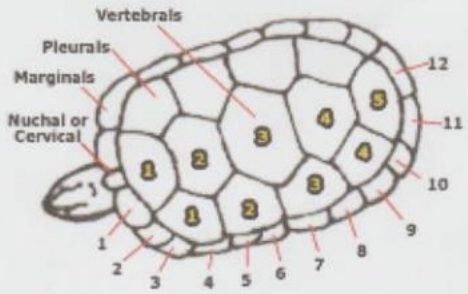


Lower shell (plastron) of box turtles. Notice the hinge which allows them to completely close their shell.

- On the turtle's side the plastron and carapace are joined together with bony structures called bridges. The inner part of the shell is made out of bones, including the backbone and the ribs. This keeps the turtle from being able to leave the shell.
- The turtle shell is covered with bony scales called scutes which are made of keratin. This is the same substance found in hair and nails of other animals. The melanin in the scutes is the reason for various pigmentation and different designs.
- Not all turtles have scales. Leatherbacks and soft-shelled turtles shell are covered with leathery skin instead
- When turtles hatch, their plates are not connected yet making them vulnerable and fragile. Over time the plates will slowly grow and fuse together. The keratin gives the turtle shell amazing regenerative abilities. If part of shell is damaged it will slowly heal overtime depending of course on the extent of the injury.
- Aquatic turtles have light shells adapted for swimming. Shells of water turtles also contain large spaces between the shell bones which are called fontanelles which helps to decrease the weight of the turtles shell which aids in swimming.
- Land turtles (tortoises) have heavy shells for better protection, therefore they cannot swim and would easily drown.
- Turtle shells vary in color. Commonly they are brown, black or green. Some species also have spots or lines
- Turtle shells vary because they have adapted over millions of years to suit how each particular species lives. The majority of tortoises have large, dome shaped shells which are difficult for predators to crush. Aquatic turtles have flat and streamlined shells allowing for improved swimming and diving.

Carapace (upper shell)





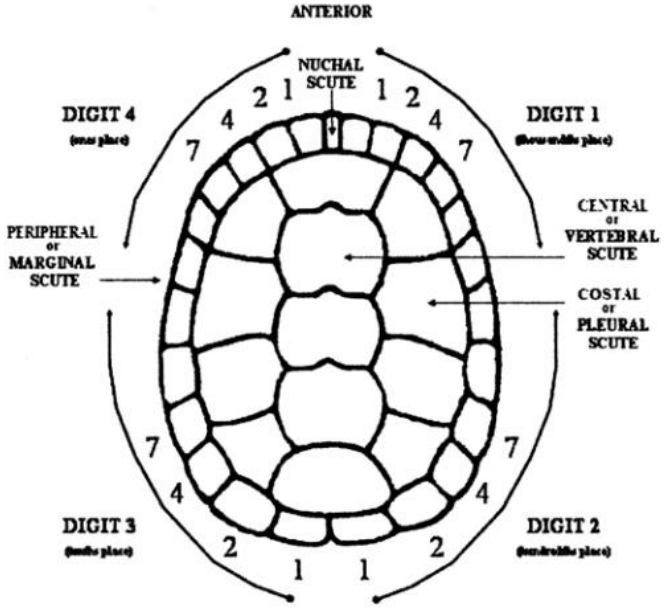


Figure 2. Dorsal view of *Terrapene* carapace with the Proximate Binary Coded Decimal (PBCD) scute-notching system (Siegrist, unpublished).

Head

- Most turtles that spend most of their lives on land have their eyes looking down at objects in front of them. Some aquatic turtles, such as snapping turtles and soft-shelled turtles, have eyes closer to the top of the head. These species of turtles can hide from predators in shallow water, where they lie submerged except for their eyes and nostrils.

- Turtles are thought to have exceptional night vision due to the large number of rod cells in their retinas. Not only do they see in color, but certain colors such as red, orange and yellow seem to be the most appealing to them. When they see an object in one of those shades, they display "investigative behavior," which suggests that they're checking it out to see if they want to eat it.

- Turtles have a rigid beak and use their jaws to cut food. Instead of teeth, the upper and lower jaws of the turtle are covered by horny ridges. Carnivorous turtles tend to have knife-sharp ridges for slicing their prey. Herbivorous turtles have serrated ridges used to cut through hard plants. Turtles use their tongues to swallow food, but unlike most reptiles, they cannot stick out their tongues in order to catch food.

Limbs

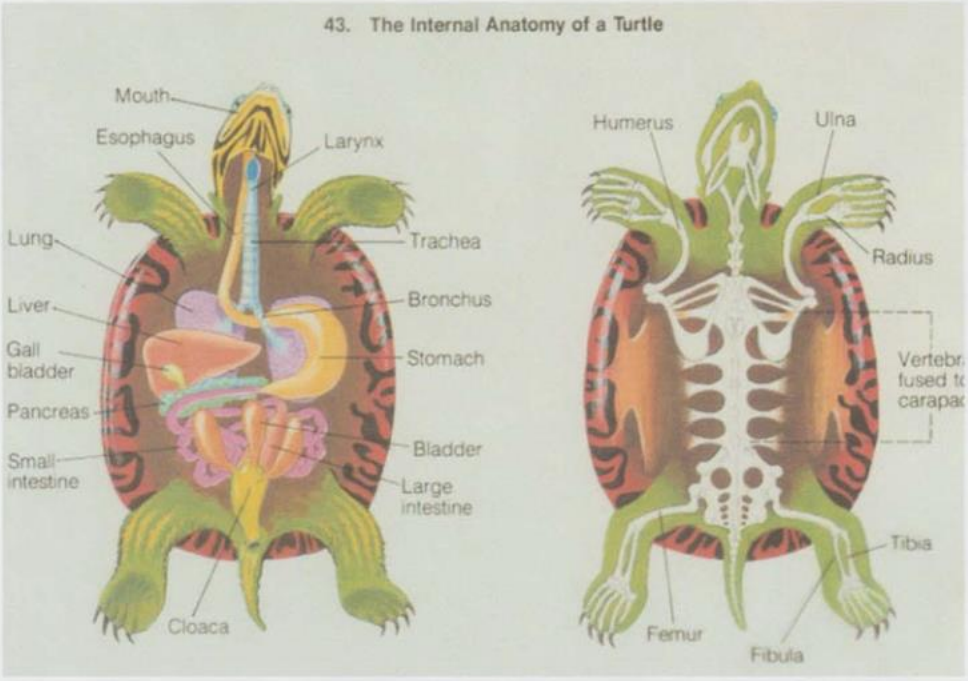
- Terrestrial tortoises have short, sturdy feet and are known for moving slowly, which is partly due to their heavy shell.

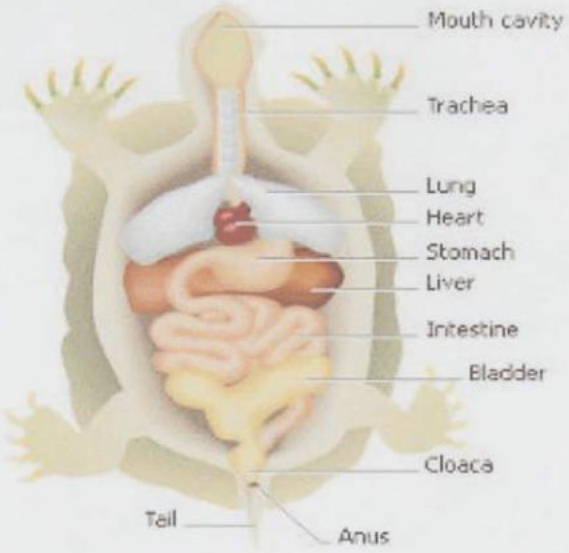
- Amphibious turtles normally have limbs similar to those of tortoises, except the feet are webbed and often have long claws. These turtles swim using all four feet in a way similar to the dog paddle. Large turtles tend to swim less than smaller ones, and the very big species, such as alligator snapping turtles, hardly swim at all, preferring to simply walk along the bottom of the river or lake. The webbed feet and long claws are used to help them climb onto riverbanks and floating logs.

Skin and molting

- Turtles and Tortoises do molt. The outer layer of the shell is part of the skin. They do not molt their skins all at once, as snakes do, but continuously, in small pieces. Small sheets of dead skin can be seen in the water of aquatic turtles, having been sloughed off when the animal rubs itself against an object. Tortoises also shed skin, but a lot of dead skin is allowed to accumulate into thick knobs and plates that provide protection to parts of the body outside the shell.

Internal Anatomy





- The rigid shell means turtles cannot breathe as other reptiles do, by changing the volume of their chest cavity via expansion and contraction of the ribs. Instead, turtles breathe in two ways. First, they employ buccal pumping, pulling air into their mouth, then pushing it into the lungs via oscillations of the floor of the throat. Secondly, by contracting the abdominal muscles that cover the posterior opening of the shell, the internal volume of the shell increases, drawing air into the lungs, allowing these muscles to function in much the same way as the a mammal diaphragm.

- If you have ever heard a turtle hiss and wonder if it means that they are mad, they are not. They are just frightened. When frightened they immediately pull their head and legs into the shell, but because of full inflated lungs they won't quite fit in. What they do is to expel the air within their lungs out as fast as they can, so that they will have room for their appendages to fit into the security of their hard shells. With rush of air leaving their bodies, turtle makes a hissing noise. Predators and humans often take this sound as a warning, which it is not.

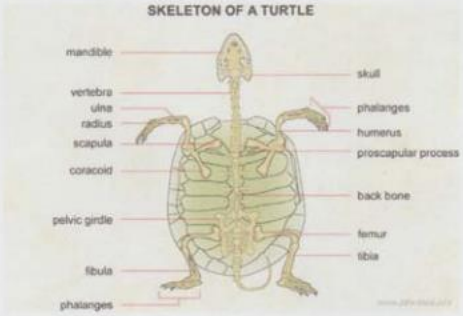
- Turtles swallow their food with very little chewing. Food particles are often whole or in fairly large chunks. The salivary glands of the turtle help to soften and break down the food to make swallowing possible.

- The liver is the largest organ in the body of a turtle. The liver has numerous functions and capabilities among which one is bile production. The gall bladder, on the other hand, is a small organ hidden behind the liver. It transfers the bile produced in the liver to the small intestine in the digestive process. Finally, the small pancreas is located next to the small intestine. It aids in the digestive process by introducing digestive enzymes into the small intestine.

- Turtles and Tortoises "pee" when they get scared. It's not actually urine, it's just water from their anal bladder that stores water

- Unlike most other animals a turtle's organs do not gradually break down or become less efficient over time. It was found that the liver, lungs, and kidneys of a 100 year old turtle were virtually indistinguishable from those of its immature counterpart.

Skeletal system



- Bones make up the majority of the skeletal system in turtles as opposed to amphibians who have a large amount of cartilage in their system. Connective tissue in turtles is mineralized and becomes bone and the interior of the bones consists of sponge like marrow.

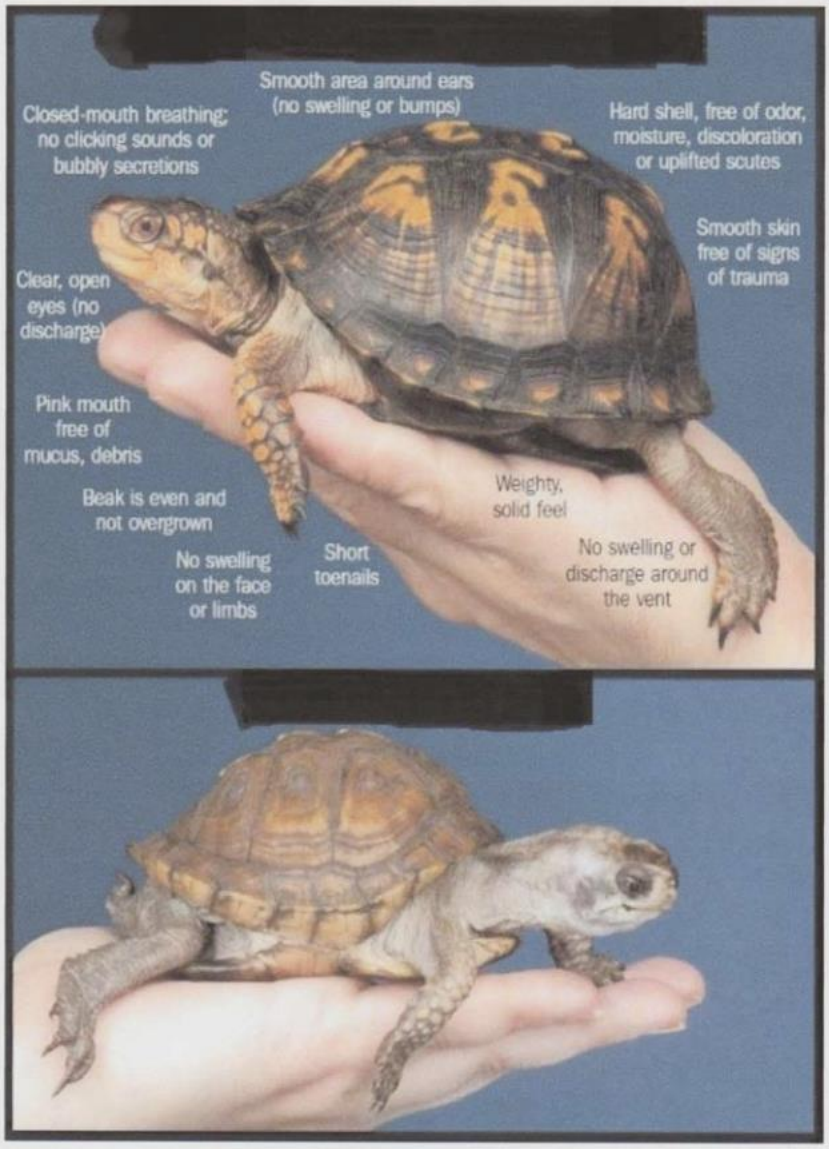
- The turtle skeleton is divided into two main sections, the endoskeleton and the ectoskeleton. The endoskeleton consists of all the internal bones and the ectoskeleton of a turtle is its shell. The endoskeleton is further divided into two subsections called the axial skeleton and the appendicular skeleton. The axial skeleton is made up of the skull and both the cervical and thoracic vertebrae. The appendicular skeleton on the other hand consists of the remaining bones in the skeleton.

Nervous system

The nervous system of the turtle is composed of the brain, nerves and spinal cord. In addition, specialized cells called neurons are the signal transmitters throughout the system. The brain is the center of turtle's nervous system and it is there that the impulses carried by the nerves from the sensory organs are processed. Although the brain of turtles is more advanced than an amphibian's it is primitive in regards to birds and mammals. The spinal cord of the turtle extends down it's back and is protected by the carapace vertebrae. It is through the spinal cord that the information is carried to and from the brain. Turtles exhibit all the same senses as most organisms but the sense of smell is most advanced

What to look for when evaluating Turtle / Tortoise health

Top picture is a healthy turtle, the bottom picture is an unhealthy turtle



Turtle and Tortoise Medical care

Barring any visible life threatening injuries all turtles and tortoises must be evaluated for dehydration upon intake.

Dehydration

The main methods for determining dehydration is the simple method of comparative weight- does it feel heavy- like a bag of sand or have some heft to it? If not, it is probably dehydrated. If you are not sure or it's the summertime, err on the side of caution and treat as if dehydrated.

Other signs of dehydration can be:

- Sunken or tearing eyes
- Reduced, thickened, or whitish urine
- Dry feces
- Dry, flaky, loose skin
- Loss of appetite
- Lethargy, depression, lack of activity
- Thick, ropey mouth mucus

Note: very young, and sick turtles will need to be soaked every other day regardless of their hydration status.

Hydrating a tortoise

The easiest way to hydrate is a forced soak. Place the patient in an escape-proof tub big enough for it to walk around some. Fill with warm water to about 1/2 way up the shell. Soak for 15-30 minutes.

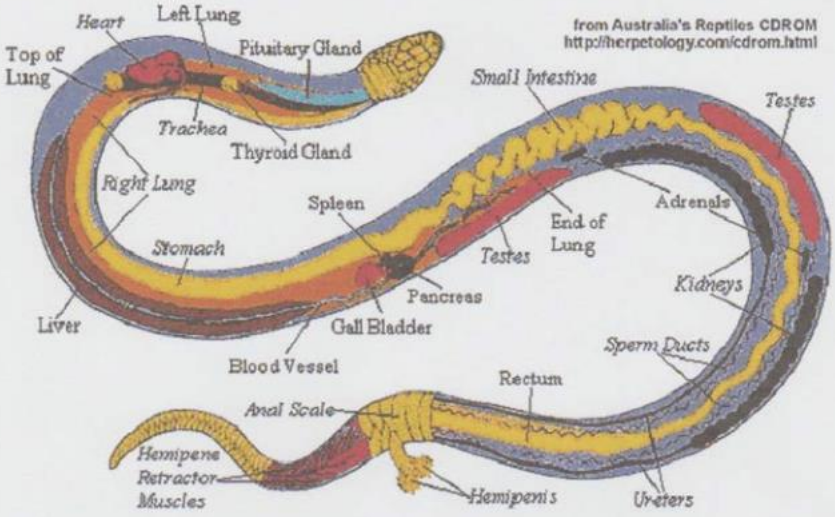
Soaking tortoises often urinate or defecate while soaking so don't be alarmed as this is normal.

Medicating

Injectable baytril is the antibiotic typically used. This is given once a day, every other day, and is injected alternately in the front legs only. Why the front legs? Because of the renal-portal system that turtles and tortoises possess. This means that any medications injected in the back area will be absorbed and go directly through the kidneys before entering the general circulation, potentially causing kidney damage. In addition the drugs may be excreted by the kidneys without ever being absorbed effectively into the body. Therefore never give injections in the back area and back legs.

Note: Medicating turtles and torts is not an easy task. Even a sick turtle will pull his head and limbs into the shell making it impossible to administer any needed medication. Additionally most turtles will attempt to bite.

SNAKE ANATOMY



Medical Services Practice Worksheet

Section One • Introduction to Medical Services

Note: Questions 1 through 12 may have more than one right answer. Circle all that apply.

1. How would you communicate new or unusual happenings that have occurred on your Medical Services shift?

    a) Write in the Daily Care journal
    b) Call the Weekly World News
    c) Make a note on the chalk board
    d) Write in the Medical Services Journal

2. When you arrive for your Medical Services shift, what will you do?
    a) Jump in and get started!
    b) Prioritize tasks according to your shift and begin
    c) Look in the Daily Care journal for any "hot" items
    d) Greet your fellow volunteers

3. How is Rabies transmitted?
    a) From the bite of a venomous reptile
    b) Only from the bite of a rabid mammal
    c) From the saliva of any mammal
    d) Only from the bite or a scratch of a rabid animal.
    e) From a bite or scratch; from contact with mucus membranes, saliva, open skin; or from nervous tissue from a rabid animal.

4. What is the fatality rate in untreated humans?
    a) 25%
    b) 50%
    c) 75%
    d) 99%
    e) 100%

5. Why might an animal be euthanized?
    a) Its injuries are too severe to hope for recovery
    b) It is not releasable and cannot be placed
    c) It would not have a good quality of life with its condition

6. You can always identify a rattlesnake because it has a rattle.
    a) True
    b) False

7. The rhyme for identifying coral snakes starts like this:
    a) Red on brown will make you frown
    b) Red on black, you should stay back
    c) Red on yellow kills a fellow
    d) Red on white, don't try to fight

8. Which of the following statements are true about Gila Monsters?
    a) They are lizards
    b) They store fat in their tails
    c) They can move fast.
    d) They are venomous
    e) Their bite is extremely painful

9. What should you say to callers that have found a baby songbird?
    a) Don't touch it, the mother will reject it
    b) Pick it up and put it back in the nest
    c) Call the Hotline for a rescue volunteer

10. Which of the following birds are non-native?
    a) Grackles
    b) Starlings
    c) Doves
    d) Pigeons

11. Which of these conditions are required by Liberty wildlife to treat bats?
    a) A current rabies pre-exposure vaccine
    b) The necessary training on handling bats
    c) Authorization to work with bats

12. Which of these conditions might indicate “exposure” to the rabies virus?
    a) A person picked up a bat from the ground and was bit.
    b) A dog brought a bat into the house.
    c) A person swept a bat into a box with a newspaper.
    d) A person touched just the fur of a bat.
    e) A bat was seen flying through your yard.

13. List two species that are common hosts of the rabies virus.
    a)
    b)

14. List two other zoonotic diseases and how they are transmitted.
    a)
        i. How it is transmitted:
    b)
        i. How it is transmitted:

15. List five things that you will do to protect yourself and your health.
    a)
    b)
    c)
    d)
    e)

16. List three of the many tasks that are the responsibility of Medical Services volunteers.
    a)
    b)
    c)

17. List three points to remember on liberty wildlife's protocol concerning our interaction with wildlife.
    a)
    b)
    c)

18. You have completed Section One: Introduction to Medical Services. What was the most interesting part of this section for you?