MINIMUM STANDARDS
FOR WILDLIFE REHABILITATION

Third Edition, 2000

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International Wildlife
Rehabilitation Council

National
WILDLIFE REHABILITATORS
Association

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CODE OF ETHICS

A Wildlife Rehabilitator's Code of Ethics

1. A wildlife rehabilitator should strive to achieve high standards of animal care through knowledge and an understanding of the field. Continuing efforts must be made to keep informed of current rehabilitation information, methods, and regulations.

2. A wildlife rehabilitator should be responsible, conscientious, and dedicated, and should continuously work toward improving the quality of care given to wild animals undergoing rehabilitation.

3. A wildlife rehabilitator must abide by local, state, provincial and federal laws concerning wildlife, wildlife rehabilitation, and associated activities.

4. A wildlife rehabilitator should establish safe work habits and conditions, abiding by current health and safety practices at all times.

5. A wildlife rehabilitator should acknowledge limitations and enlist the assistance of a veterinarian or other trained professional when appropriate.

6. A wildlife rehabilitator should respect other rehabilitators and persons in related fields, sharing skills and knowledge in the spirit of cooperation for the welfare of the animals.

7. A wildlife rehabilitator should place optimum animal care above personal gain.

8. A wildlife rehabilitator should strive to provide professional and humane care in all phases of wildlife rehabilitation, respecting the wildness and maintaining the dignity of each animal in life and in death. Releasable animals should be maintained in a wild condition and released as soon as appropriate. Non-releasable animals which are inappropriate for education, foster-parenting, or captive breeding have a right to euthanasia.

9. A wildlife rehabilitator should encourage community support and involvement through volunteer training and public education. The common goal should be to promote a responsible concern for living beings and the welfare of the environment.

10. A wildlife rehabilitator should work on the basis of sound ecological principles, incorporating appropriate conservation ethics and an attitude of stewardship.

11. A wildlife rehabilitator should conduct all business and activities in a professional manner, with honesty, integrity, compassion, and commitment, realizing that an individual's conduct reflects on the entire field of wildlife rehabilitation.

MESSAGE FROM THE PRESIDENTS

Fellow Wildlife Rehabilitators,

We are pleased to offer to you this revised and updated *Minimum Standards for Wildlife Rehabilitation*. This is a cooperative effort that represents the most current knowledge, expertise and techniques in our field. It is a reflection of what we have learned collectively, and have successfully applied during the last three decades. These *Minimum Standards* are based on accepted norms in biology, medicine, behavior, natural history, and, of course, wildlife rehabilitation. The information pertains to all who rehabilitate wildlife, regardless of numbers and types of wildlife cared for, budget size, number of paid or volunteer staff, and size and location of activity.

This book is a foundation upon which each wildlife rehabilitator can build an appropriate and effective practice. The goal is to give each animal the best chance of post-release survival in its natural place in the wild. Wildlife rehabilitators should combine information from *Minimum Standards*, current publications, wildlife veterinarians, experienced mentors, and personal experience, along with common sense and good judgment to make the best decisions for each individual animal. All rehabilitators are encouraged to improve upon these standards as they strive to provide the best possible care.

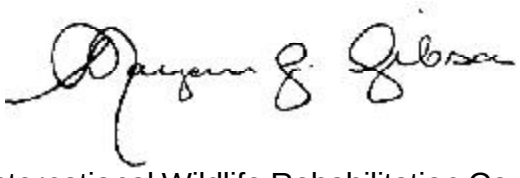
Although this edition is our current foundation, we recognize that as we learn more about housing sizes and materials, nutrition, species behavior, and other aspects of wildlife rehabilitation and medicine, we will certainly improve our methods. Future editions will incorporate the advancements we make.

This document has been designed BY wildlife rehabilitators FOR wildlife rehabilitators. We understand that some wildlife agencies have chosen to use all or parts of our *Minimum Standards* in their permitting or licensing processes. We encourage such use but stress that the information must be kept in context and used to improve the rehabilitative care of wildlife. Our intent is not to exclude, but to include and encourage rehabilitators as they strive to improve.

Our Wildlife Rehabilitator's Code of Ethics is a part of these *Minimum Standards* and is based on the principles of honesty, integrity, responsibility, and treating others as we would have them treat us. The Code of Ethics provides basic rules of conduct for each of us to incorporate into our practice. The resulting self-respect, peer respect, and community respect and credibility will increase our effectiveness in animal care, networking, fund-raising, volunteer management, educational efforts, and all aspects of wildlife rehabilitation. Ethical and professional conduct by each wildlife rehabilitator will also contribute significantly to the credibility of our field as a whole, which, in turn, will benefit all of us.

We are proud of this collaborative effort! We encourage all wildlife rehabilitators to actively use this document to help improve the care, treatment, and successful release of wildlife.

Elaine M. Thrune, President
National Wildlife Rehabilitators Association



International Wildlife Rehabilitation Council

STATEMENT OF PURPOSE

The *Minimum Standards for Wildlife Rehabilitation (Minimum Standards)* is a document created by and for wildlife rehabilitators. This document is intended to help increase the number of rehabilitated wildlife that are successfully returned to wild populations by providing: a) standards and guidelines for care; b) a mechanism for self-evaluation; and c) recommendations and information regarding wildlife care. All rehabilitators are encouraged to explore and understand the principles underlying these standards, and to apply them in the everyday care of wild animals.

This document is not intended to be an enforcement program. Each state or province may or may not have its own requirements for rehabilitation activities and facilities. Permit requirements vary and are not necessarily related to this document. Some state and provincial agencies, however, use this document when establishing permit programs. The U.S. Fish and Wildlife Service uses the information contained in this document as part of the Standard Conditions attached to rehabilitation permits for migratory birds and endangered species.

The *Minimum Standards* is not a static textbook, but a living document that changes constantly as the field of wildlife rehabilitation grows and improves, and as the needs of individual animals demand. The procedures and cage sizes described herein have been developed by experienced wildlife rehabilitators, and are considered to be **MINIMUM** standards - i.e., more detailed procedures or larger cages are certainly acceptable and encouraged! Because wildlife patients undergoing rehabilitation are individuals, each with different injuries and unique behaviors, recommended cage sizes and techniques may not apply to every case. The wildlife rehabilitator is encouraged to alter techniques for housing, pre-release conditioning and other aspects of the rehabilitation process, so long as basic natural history, comfort, and hygiene needs are met. Cage dimensions can be modified to accommodate special needs of the facility, animal or new advancements in the field.

These *Minimum Standards* do **NOT** apply to animals kept beyond the normal scope of wildlife rehabilitation. Animals that are kept for educational, display, or captive breeding purposes have different housing requirements based on the needs of the individual. Those specific needs are not addressed in this document.

Chapter 1 - MINIMUM STANDARDS FOR REHABILITATION PROCESS

Minimum Standards for Wildlife Rehabilitation is a joint effort of the National Wildlife Rehabilitators Association (NWRA) and the International Wildlife Rehabilitation Council (IWRC). The objectives of this document are to establish professional standards for wildlife rehabilitation, to encourage the development of improved wildlife rehabilitation programs, and to improve care for all wild animals in rehabilitation.

Complying with *Minimum Standards* requires self-examination by the rehabilitator. Improvements in care and treatment protocols can be made and better facilities can be planned for using the information set forth in this publication. These minimum standards have been formulated by committee members, with extensive input from IWRC and NWRA members, and approved by the board of directors of both of these wildlife rehabilitation organizations.

This document has been designed to accommodate both the individual rehabilitator and the rehabilitation organization.

1.1 Background

The need for minimum standards for wildlife rehabilitation only became apparent in the past 15 years or so. Wildlife rehabilitation on the other hand, in one form or another, has existed for many years; it has ranged from the good-hearted individuals who first applied improvised methods for returning injured or orphaned wildlife to their native habitat, to the dedicated individuals and institutions that today continue this tradition with the increased knowledge, resources and support that results from decades of collective experience. Organized wildlife care programs originated as an outgrowth of nature and science centers and humane societies in response to public concern for injured wildlife. Some of these programs are now over thirty years old.

The field of wildlife rehabilitation experienced rapid growth beginning in the early 1970s as people became more environmentally aware of the limits of our natural resources. Oil spills triggered large scale attempts to save thousands of oiled water birds and helped raise the consciousness of industry, government and the public about the multiple hazards faced by wildlife. Programs were organized to address the impacts of human populations on native wildlife. Most of these efforts were accomplished with few funds, volunteer assistance, pre-existing facilities, and without government support.

In the early 1980s, financial support for these endeavors came mainly from private sources and, in a small part, from government sources. The numbers of paid staff positions began to increase as newly established organizations developed fund-raising abilities and benefitted from the support of the public. During the 1980s and 1990s, there was an increase in the development of entirely new wildlife care facilities to replace the makeshift facilities used in the 1970s.

Concurrent with these growth trends in the field, the Boards of Directors of the NWRA and the IWRC saw a need to establish basic minimum standards for both the individual rehabilitator and rehabilitation centers. This was partly due to the difference in willingness among participants to continually upgrade their programs, a step deemed necessary in a field with rapidly changing information and techniques.

1.2 Minimum Care Requirements

This chapter of the *Minimum Standards* walks the wildlife rehabilitator through a series of steps specifically designed to increase the chance of a successful release. The information in this first chapter will orient the rehabilitator to basic protocols and familiarize her/him to the information in the following chapters.

The goal of this chapter is to provide a blueprint for successful rehabilitation and guide the rehabilitator through the care and clinical protocols. An example of an information form is found in Appendix A. Using forms ensures that vital information is gathered for each patient. Written records are important in measuring how rehabilitation affects wildlife; therefore, a section describing statistical standards is provided. Many rehabilitation permits require a cooperating veterinarian as a condition for legitimate operation of a wildlife care facility (of any size), and a veterinary policy is provided to clarify how this relationship is intended to work. A facilities review checklist at the end of this chapter is a useful self-evaluation tool.

Minimum standards for wildlife rehabilitation apply not only to the facilities used for rehabilitation, but to all aspects of the work involved. The outline in Table 1 is meant to serve both as guidance for the rehabilitator, and as an explanation of the rehabilitation process for the non-rehabilitator.

Various steps of the process will change from one patient to another, depending on the species, the condition of the individual animal, and other conditions specific to that case. In all cases, additional steps may certainly be added; however, the rehabilitator should try to include these basic steps for each patient. The order of the steps taken and the specifics involved in each step (for example, the type and quantity of fluids) will depend on each animal, its condition, and the materials and experience available to the rehabilitator. The initial treatment will vary the most, depending again on the nature of the injury, the individual animal, the overall condition of the animal, and the materials and experience available to the rehabilitator.

Table 1: Chronologic Outline of the Rehabilitation Process - Minimum Care Procedures For Wildlife Rehabilitation

1) Admission of the animal
   a) Gather history from the person presenting the animal
   b) Record all information (see Form 2, Appendix A)
   c) Provide relevant educational material to the presenter
2) Stabilization of the animal
   a) Evaluate the animal quickly when transferring to a holding pen/cage/etc.
   b) Examine for critical conditions and administer emergency care as needed
   c) Provide warmth (unless hyperthermic)
   d) Provide quiet rest space
   e) Prepare materials needed for exam
3) Initial Examination
   a) Weight
   b) Temperature (as able)
   c) Visual exam
   d) Palpate limbs
   e) Examine orifices
   f) Assess nutritional status and condition
4) Initial Treatment
   a) Provide fluids
   b) Clean and treat any wounds
   c) Stabilize fractures
   d) Administer medications (antibiotics, steroids, etc.)
   e) Provide appropriate, palatable nutrition for species and status
   f) Conduct or schedule any ancillary diagnostics (radiographs, bloodwork, fecals, etc.) and any additional treatments (surgeries, follow-up wrap changes, etc.)
5) Intensive Rehabilitation
   a) Monitor weight
   b) Provide ongoing, appropriate nutrition
   c) Treat medical problems as needed
   d) Provide comfortable, appropriate housing and habitat, minimize interaction with human activity
6) Intermediate Rehabilitation (restricted activity)
   a) Monitor weight
   b) Provide ongoing, appropriate nutrition
   c) Treat medical problems as needed (should be minimal)
   d) Provide comfortable, appropriate housing and habitat with mental stimulation, minimize interaction with human activity
   e) Provide manual physical therapy as needed

7) Pre-Release Conditioning (unlimited activity)
    a) Provide larger, outdoor housing
    b) Monitor weight and general condition
    c) Provide ongoing, appropriate nutrition, introducing a more natural diet
    d) Treat any primary or secondary medical problems as needed (should be minimal)
    e) Exercise daily, as appropriate for that species
8) Release Evaluation (some exceptions for each category)
    a) Ability to self-feed (perhaps catch live prey)
    b) Normal mobility and function, reasonable level of physical fitness and stamina necessary for foraging, breeding, or territory defense behavior if predicted
    c) No evidence of disease
    d) Normal weight for that species/sex/season
    e) Normal blood values (where appropriate/feasible and known)
    f) Suitable release sites available (see Section 7.2)
    g) Normal behavior (the animal exhibits reasonable responses to human activity, exhibits normal socialization with both same and other species)
9) Release
    a) Provide proper/safe transportation
    b) Choose appropriate season/time of year (migration, breeding season, etc.)
    c) Choose appropriate time of day
    d) Provide food if appropriate
    e) Monitor post-release if possible

1.3 Recording & Reporting Requirements

Records are a vital part of any rehabilitation program, and are particularly important when an individual or an organization is trying to learn from previous work in an effort to improve the care given to wildlife. Record keeping has been placed in two categories: required information and recommended information. Records should be kept on all animals. Formats may vary. Records can be consolidated for healthy litters or clutches of animals raised for release. Daily forms for animals by pen, enclosure, or cage are required to verify that food, medications, and care are being provided.

Statistics should conform to specifications listed in Section 1.4. Annual statistics and, in some cases, individual case information are required to be reported to U.S. Fish and Wildlife Service and many state and provincial agencies.

All birds (dead or alive) that indicate suspected poisoning or other criminal activity must be reported to the U.S. Fish and Wildlife Service Law Enforcement Office immediately upon acquisition. All threatened or endangered species (dead or alive) and all bald or golden eagles must be reported to the permit-issuing office within 48 hours.

Required Information

- Species
- Date admitted
- When and where found
- Name/address/phone number of finder
- Presenting injury/problem
- Initial weight
- Case or acquisition number
- Record of notifying U.S. Fish and Wildlife Service Regional Permit office in cases of endangered or threatened species, or bald or golden eagles
- Record of notifying U.S. Fish and Wildlife Service Law Enforcement in cases of birds being shot, poisoned or victims of other illegal activity
- Final disposition (i.e., released, transferred, placed, died, euthanized), including date, and location of release where applicable
- Recipient information if transferred or placed (name, address, permit number and purpose of transfer), including the transfer or placement of carcasses for educational purposes
- Type and amount of euthanasia drug if a controlled substance was used
- Federal band number, where applicable
- Completed daily care forms
- Any additional information required by state or provincial permitting agency

Recommended Information

- Any additional history that might be provided by the presenter (regarding cause of injury, severity or time of injury/problem, any care given by the presenter, etc.)
- Physical examination data
- Daily treatment information and efficacy
- Data regarding surgery, clinical pathology, necropsy, histopathology (where applicable)
- Release weight
- In suspected poisoning cases, any additional information describing the site where the animal was found, weather, other species present, etc.

See Appendix A for a sample form used to collect information from the person presenting the animal, and a sample examination form for collection of the other data. The sample forms were designed for use with birds, but could be easily adapted for use with other wildlife.

1.4 Statistical Standards

Definitions

The code letters used by wildlife rehabilitators and rehabilitation centers can vary, but should be strictly defined for comparison purposes. Referenced categories should correspond to the following:

R (RELEASED): Any healthy, recovered animal that is returned to its natural, wild habitat

T (TRANSFERRED):

1) Any animal transported to another facility or wildlife rehabilitator for further rehabilitation efforts. (Note: if the animal is known to have been released by the receiving facility, it is still recorded as a 'T' by the original facility and as an 'R' by the receiving facility).

2) Any animal determined to be unreleasable while undergoing wildlife rehabilitation efforts that is placed in a non-rehabilitation situation.

NOTE: Agency permission (federal and state or provincial) is usually required prior to transfer of live animals, and the recipient must possess the proper permits.

For individual center's information, this can be further subdivided into (optional):

TR (TRANSFERRED FOR REHABILITATION)
TD (TRANSFERRED FOR DISPLAY)
TE (TRANSFERRED FOR EDUCATION)

P (PENDING): Any animal still undergoing rehabilitation efforts. These animals are only added to summary statistics after final resolution.

D (DIED): Used for any animal either received dead or which dies during the rehabilitation process. Can be subdivided into (optional):

DOA (DEAD ON ARRIVAL): Any animal that dies before any lifesaving measures or treatments can be implemented in the care facility. This assumes needed measures are undertaken immediately upon receiving the animal. Placing the animal in a quiet, dark environment is using a form of treatment.

DIC (DIED IN CARE): Any animal that dies subsequent to any handling, exam, treatment, or implementation of lifesaving measures in the care facility.

E (EUTHANIZED): Any animal that is suffering or non-releasable that is euthanized. Can be subdivided into (optional):

EOA (EUTHANIZED ON ARRIVAL): Any animal euthanized after an initial exam without further treatment measures being done.

E (EUTHANIZED): Any animal euthanized after treatment measures have been implemented.

Data Analysis for Release Rate for Releasable Animals

$$\% \text{ Released} = \frac{\text{\# Released}}{\text{(Total \# Received - DOA)}}$$

Note: released animals do NOT include transferred, placed or pending animals.

Rehabilitators are encouraged to divide their statistics further into the categories of avian, mammalian, and herpetile species, both for their own information, and to help with comparisons with data from other individuals and centers. This will help with statistical comparisons between those that deal strictly with avian species, those that deal with both avian and mammalian species, those that may deal strictly with herpetiles, etc.

1.5 Veterinary Policy

In most states and under most circumstances, the legal prescription of medical care for wildlife patients is the responsibility of a veterinarian. The veterinarian may delegate a portion of this responsibility to a rehabilitator by means of a mutually agreeable, written protocol wherein these responsibilities are clearly defined. Such an arrangement allows the veterinarian to prescribe a specific treatment protocol for a specific type of injury without having to see each individual patient (e.g., the veterinarian may prescribe a certain antibiotic to be given at a specific dosage, frequency and duration for all cat attack victims). This type of arrangement also requires that an appropriate veterinarian-rehabilitator-wildlife patient relationship exists and has the following components:

1. The veterinarian has assumed the responsibility for any medical judgments regarding the health of wildlife patients and the need for medical treatments.

2. The veterinarian has sufficient knowledge of wildlife medicine to permit a general or preliminary diagnosis. Furthermore, the veterinarian has recently seen and is personally acquainted with the general conditions and care of the wildlife patients through medically appropriate and timely visits to the premises where the wildlife patients are kept, or timely transport of wildlife patients to the facility of the attending veterinarian.

3. If the veterinarian intends to keep and treat any animal for more than 24 hours, the veterinarian must have the appropriate wildlife rehabilitation permit(s) or be listed as a subpermittee to the wildlife rehabilitator. Wildlife housed at a veterinary hospital must be housed in an area that is quiet and removed from domestic animals and human traffic.

4. The veterinarian is readily available for follow-up in case of adverse reactions or failure of the regimen of therapy. Such follow-up should be specific in any written agreement between the rehabilitator and the veterinarian.

5. Any agreement must abide by the laws and regulations governing the practice of veterinary medicine where and if they apply to wildlife rehabilitation.

1.6 Wildlife Rehabilitation Facilities Review

Rehabilitation facilities and individual rehabilitators often benefit from doing a regular self-evaluation or self-review. A form used to assist in this type of self-evaluation is found in Appendix A (Form 1). The purpose of this form is to provide wildlife care-givers suggestions to save time (for example, keeping reference materials at the phone), to ensure wildlife receives appropriate housing and medical treatment (exam area, caging, veterinary and diagnostic), and to protect both wildlife and humans from disease and contamination (food preparation, disinfecting, housekeeping). Not all items contained in the form will apply to everyone - an individual rehabilitator probably does not require a grievance committee or Worker's Compensation Insurance - but this form does provide an easy reference to be sure important considerations are not overlooked when changes, such as facility growth, occur.

Chapter 2 - DISEASE CONTROL

2.1 Rationale for Disease Control

The safety and health of the humans caring for wildlife is a critical facet of successful rehabilitation. Many diseases are transmitted from animals to humans, and also from animal to animal. This chapter instructs rehabilitators on effective ways to prevent the spread of disease from wildlife to caretakers, domestic animals, and other wildlife patients. Proper disease control is a serious concern for rehabilitators and permit granting agencies. Adherence to the suggested protocols is highly recommended by the NWRA and the IWRC.

Facility cleanliness is an integral part of disease prevention and containment. Proper cleaning agents combined with a sensible cleaning schedule will reduce the spread of disease within a facility. Cleaning protocols vary considerably based on the species and condition of animals in care, facility type, and cage construction. Choice of cleaning agent must be made with these variables in mind. Included in this chapter are cleaning agent descriptions and a table of agent properties that will help in making appropriate selections. The timing of cleaning efforts is another important feature of effective disease prevention. Suggestions for proper and regular maintenance in this chapter will help rehabilitators prevent disease within their facility.

2.2 Prevention of Disease Transmission

Since transmissible diseases are so diverse in their origin and action, it is most useful to approach their control according to their mode of transmission. The general modes of transmission are:

1. Diseases passing directly from one vertebrate host to another via direct contact (bite, etc.)
2. Indirect transmission involving one or more intermediate hosts (vectors) such as arthropods or prey species
3. Indirect transmission involving aerosol particles or fomites (inanimate objects such as clothing, utensils, food dishes, cage bedding, etc.)

Disease organisms enter the body by one or more of six routes:

1. Inhalation
2. Ingestion
3. Inoculation (animal bite, injection, insect bite, or direct contact via a preexisting opening in the skin)
4. Genital tract via coitus or contaminated instruments
5. Transplacental (from the mother - mammals only)
6. Across the umbilicus or yolk (from the mother)

For each of these modes of transmission there must be an effective strategy to interrupt the transmission cycle. The wildlife rehabilitator's primary defense against diseases communicable from animal to humans is a high standard of personal hygiene. The primary control of diseases communicable from animal to animal is containment, with the first line of defense being the individual cage or pen.

2.3 Standards to Prevent Disease Transmission within the Facility

2.3.1 Control of Diseases Transmissible from Animals to Humans

- Clothing should be clean and changed as often as necessary. It is suggested that the facility provide lab coats or other tops to volunteers and launder them on-site.
- Shoes and boots should be kept clean of fecal matter, dirt, and cage litter.
- Disposable gloves and surgical masks must be available for use during such procedures as necropsies or cleaning contaminated animal quarters. Necropsy procedures must adhere strictly to sanitary practices including the use of surgical masks and disposable gloves, appropriate outer garments, and the use of disinfectants.
- Lavatory facilities should be accessible with hand-washing sinks and suitable washing agents.
- Eating, drinking and smoking should be restricted to designated areas free of animal waste materials.
- The supervisory staff must be given basic information on zoonoses. Personal hygiene rules should be established and the supervisory staff should set an example.
- All personnel and volunteers should be advised to seek the consent of their physicians before working in the facility. They should acquire any necessary vaccinations (especially tetanus). If working with mammals, they should inquire about the possibility of pre-exposure rabies vaccinations. Female workers who become pregnant should be advised to renew medical consent. Rehabilitators handling potential Rabies Vector Species (RVS - most adult mammals) should have pre-exposure rabies vaccinations. See Section 2.3.3.
- There must be separate refrigeration facilities for food (animal food kept separate from human food) and for carcasses and postmortem specimens.

2.3.2 Control of Diseases Transmissible from Animal to Animal

- Cages should be designed for efficient cleaning. When possible, seamless, nonporous materials (such as stainless steel, fiberglass or plastics) should be employed for cage construction and food containers.
- Animal enclosures should be kept sanitary by having an adequate and routine cleaning regimen in which responsibilities are clearly defined and assigned to personnel. While daily removal of feces and urine from mammal cages is necessary to prevent odor, parasite re-infestation, and insect overpopulation, avian, reptile, and amphibian cages usually require less frequent cleaning. Many adult birds, especially songbirds, as well as other injured wildlife, are very easily stressed during the rehabilitation process, thus daily disturbances should be minimized. Infant mammal and bird caging requires much more frequent cleaning; bedding or nest cup linings should be changed each time the animals are fed. The floors of many indoor avian cages may be lined with layers of newspaper, paper towels, or other substrates, which can be removed one layer at a time for easy disposal of urates, feces, etc. Large flight aviaries may also be cleaned on a less frequent basis, provided there is a regular schedule for cleaning. Caging for aquatic herpetiles may be kept clean primarily through the use of proper water filtration systems.

- Indoor facilities are required to have efficient ventilation and air movement with minimal recycled or reused air.
- In all circumstances, protocols for regular cleaning should be in place, and all cages should be properly disinfected between patients (when an animal or group of animals is removed, the cage should be disinfected before new animals are placed in the cage). Because of the high incidence of *Baylisascaris procyonis* (the intestinal roundworm of raccoons), the fatal transmission of this parasite to other species, and the high resistance of this parasite to disinfectants, caging used for raccoons should be designated as such, and should not be used to house other species. Before a newly-acquired animal is introduced into a cage or enclosure that has previously been used by another animal, the cage must be thoroughly cleaned and disinfected and the bedding material changed.
- Animals confirmed or suspected of having contagious diseases must be kept isolated from all noninfected susceptible animals. Newly acquired animals should be housed separately from in-house animals upon arrival. Animals that are presented together (littermates or nestmates) may be housed together during this period. They should not be added to a group pen until it has been established that they are in good health.
- A routine examination for parasites should be performed on new arrivals, with re-examination at intervals during protracted rehabilitation.
- Bowls, feeding utensils, medical equipment, linens used for handling animals and for animal bedding, and gloves worn while handling wildlife should also be cleaned/replaced daily and disinfected between use on different animals.
- Water bowls should be cleaned and/or changed as needed to keep them clear of algae, leaves, feces, and other debris.
- Animal diets must be prepared and foodstuffs should be stored under sanitary conditions that ensure freedom from vermin and microbial contamination.

2.3.3 Public Health Responsibilities

- All organic refuse must be collected into airtight bags or containers and stored in a safe location until it is removed from the premises. The supervisory staff is responsible to local public health officials on matters regarding waste and postmortem material disposal.
- Domestic animals should not be allowed at the rehabilitation facility. If this is unavoidable, domestic animals should be fully vaccinated and should have no direct contact with, nor direct exposure to, wildlife.
- Personnel must take care to properly wash and change clothes before coming in contact with domestic animals.
- A program for rodent and insect control is recommended for wildlife care facilities; however, if pesticides are used, care should be taken to avoid contaminating both human and animal food and housing areas with pesticides.
- The rescuer or individual presenting an animal to a rehabilitator should be questioned regarding the possibility of any contact with the animal, such as bites or scratches. If injured, the individual should immediately be referred to his/her own physician for medical attention. The rehabilitator should also notify the public health department of any such

injuries, if required by state law. If the bite or injury is from an RVS, the animal should be euthanized and tested for rabies.

- All rehabilitators handling mammals (especially adults) should have pre-exposure rabies vaccinations and be knowledgeable in the handling of these species. Any bites from an RVS should be reported to the public health department. Animals suspected of rabies and that are to be tested should be refrigerated immediately following death or euthanasia; these carcasses should NOT be frozen or the test results will often be invalid.

2.3.4 Release Considerations

Rehabilitated adult animals should be released within the animal's normal home range, or within 10 miles from point of capture, when possible and reasonable. This practice minimizes the unnatural spread of parasites, diseases, and genetic material among wild populations, and maximizes the animal's chance of survival. Exact release location and time should be chosen at the discretion of the rehabilitator, based on the appropriateness of the habitat and the condition of the animal. When circumstances allow, rehabilitated adult birds should be released in a suitable habitat as close as possible to the point of their capture except during migration. If migration has occurred while the bird has been in captivity, the bird should be released in the area of the migratory destination. Studies have shown that rehabilitated reptiles and amphibians should be released within 1/2 mile of the point of capture to maximize their chance of survival.

If information regarding the location of capture is not available, the release of the animal should be within the standards set by the state/provincial wildlife agency and should meet all habitat requirements of the animal. Intimate knowledge of the species' natural history and behavioral patterns is essential in choosing the correct habitat. Studies that examine outcomes of released animals indicate that incorrect habitat selection increases mortality.

Juvenile animals, especially those that were brought into rehabilitation as infants, do not have to be released at the site of capture to ensure survival; however, efforts should still be made to release these animals within 10 miles of the capture site, if possible. When return is not possible (retrieval area is contaminated, contains definite hazards for the animal or the individual doing the release, etc.), these animals should be released in a suitable habitat.

Some considerations when assessing what a suitable habitat constitutes for a particular species include: adequate space not occupied by territorial conspecifics; suitable shelter; proper terrain and vegetation; good food and water supply; minimal number of predators; and suitable distance from human development.

2.3.5 Disposal of Carcasses and Animal Waste Products

Each animal that dies or is euthanized while under the care of a wildlife rehabilitator should always be examined carefully to confirm that the animal really is dead (lack of pulse or heart beat). Carcasses should then be disposed of properly and in accordance with local laws and parameters set forth in individual wildlife rehabilitation permits (e.g., the rehabilitator may be required to transfer the carcasses of endangered species to a specified location). Unless otherwise directed, all bald and golden eagle carcasses and loose feathers must be sent to the National Eagle and Wildlife Property Repository (Rocky Mountain Arsenal, Building 128, Commerce City, Colorado 80022, PH: 303-287-2110, EM: dennis_wiist@fws.gov).

If the rehabilitator plans to necropsy the carcass or transfer it to a diagnostic facility for the purpose of necropsy, the carcass should be wet with cold water, unless the animal is a suspected victim of pesticide poisoning (water might remove pesticides contaminating the outside of the animal). The addition of a small amount of detergent to the water will help to penetrate the fur or feathers, speeding up the process of cooling the body. If the necropsy is not performed immediately, the wet carcass should be placed in a plastic bag, sealed, labeled, and refrigerated in an ice chest or refrigerator not used for food storage. A necropsy performed shortly after death allows collection of more accurate information. This accuracy fades as more time passes due to postmortem changes which can alter or mask signs. Gloves and surgical mask must be worn while conducting necropsies. Necropsies should be performed in a well-ventilated location, separate from live animal and food preparation areas.

NOTE: Endangered or threatened species and bald or golden eagles must not be necropsied without first obtaining permission from the U.S. Fish and Wildlife Service.

Carcasses that are not necropsied may be transferred to local natural history museums, universities or other institutions for study and/or addition to their collections. The wildlife rehabilitator should contact these institutions and arrange for proper handling of the carcasses so that the institutions can gain the most benefit from them (e.g., carcasses may need to be frozen, placed in formalin, etc.). Specific data may also need to be recorded by the rehabilitator such as date and location animal was found, live body weight, etc. In many cases, the information provided by the rehabilitator can be as valuable as the specimen itself.

If the wildlife rehabilitator desires to keep specific parts or portions of avian carcasses (e.g., skeletons or skins for educational purposes, etc.), special permits must first be obtained from the U.S. Fish and Wildlife Service. Many state wildlife agencies also require special permits to possess wildlife parts. Special permits are not required for the rehabilitator to possess a limited number of feathers (excluding eagle feathers) for imping purposes.

All other carcasses and all animal waste products should be disposed of in accordance with acceptable practices as required by local ordinances as well as applicable state/provincial and federal regulations. Carcasses and organic wastes suspected of disease contamination should be either buried or incinerated. Where legal, burial of carcasses should be at a depth that will discourage scavenger species from unearthing them, and lime should be spread on top of the carcasses to assist in disease control. Incinerators are generally cost prohibitive to most rehabilitators and rehabilitation facilities, and special permits are required to operate incinerators in most areas. Many local animal control shelters or laboratories have incinerators and the rehabilitator may be able to arrange for these facilities to incinerate carcasses on a regular basis. Carcasses may be frozen for a limited period of time (in nonfood freezers) for storage prior to incineration or donation to pre-approved facilities (public institutions or individuals authorized to possess the specimens for educational purposes).

2.4 Disinfection

Disease control and prevention are the obvious "why's" of facility cleanliness. The following information pertains to the "how's" of creating and maintaining a clean facility.

2.4.1 Definition of Common Terms

Antiseptic:

A substance capable of preventing infection by inhibiting the growth of infectious agents (implies use on living tissue).

Bacterial spores:

The resting or vegetative stage of certain bacteria (especially *Bacillus* and *Clostridium*) characteristically very resistant to environmental changes.

Cytotoxic:

Having the characteristic of killing cells.

Diluent:

Substance used to make a concentrated solution more dilute. Sterile water and saline are common diluents for wound treatment, and tap water is a common diluent for general disinfection.

Disinfectant:

A substance that destroys microbial organisms or inhibits their activity.

Disinfection:

Destruction of vegetative forms of microorganisms (implies use on inanimate objects).

Sterilization:

The destruction of all microorganisms in or about an object (term is only used with inanimate objects). [Note: "cold sterilization" refers to the specific method of using a disinfectant solution to soak objects, rather than applying heat, pressure, or gas as used in other methods of sterilization].

Volatiles:

Agents that evaporate rapidly and pass readily in the form of a vapor. Toxic components within these vapors can be dangerous.

2.4.2 Types of Cleaning Agents

There are various disinfecting agents that should be used after regular cleaning to properly sanitize. Suggested uses are listed under each category of cleaning agent, and some products work better against specific disease entities. The rehabilitator, however, should be aware that none of these products is designed for any specific target or single use. In addition, none of these products is specifically effective against nematode eggs or larvae (intestinal worms). Most parasites are best removed from the environment by simple mechanical means (i.e., removal of feces and physical scrubbing of cages and cage contents), while other parasites, such as *Baylisascaris*, may be very difficult to completely remove from the environment. Many disinfectants emit potentially harmful volatiles; therefore, when disinfectants are used in cages, the cages should be allowed to dry thoroughly before placing animals into the cages. Some of the more common agents and methods are discussed here; additional information can be found in the references in Appendix B.

Detergents:
Detergents are cleaning compounds and include both soaps (anionic - alkali salts; negatively charged) and synthetic detergents (cationic - colloidal in solution; used as antiseptics, wetting agents, and emulsifiers; positively charged). While soaps are non-antibacterial, the physical scrubbing action of cleaning removes many of the microorganisms. Detergents alone do have minor disinfectant action against vegetative bacteria; however, they are not effective against fungi or viruses. Additionally, they lose their effectiveness in the presence of blood or tissue debris.
Examples: Dish detergents and laundry detergents.
Uses: Initial washing of cages, food bowls, etc., to remove organic matter.

Alcohols:
Solutions of 50-70% isopropyl alcohol or 70% ethyl alcohol are commonly used alone or combined with other disinfectants. Isopropyl has a wider range of antibacterial action and is less corrosive than ethyl alcohol. Alcohols act by denaturing soluble proteins, interrupting metabolism, depressing surface tension and lysing (breaking open) cells. Because it is cytotoxic, alcohol should not be used on open wounds. Alcohols inactivate phenols, so the two should not be combined. Alcohols are not effective for cold sterilization, and may damage rubber, plastic and other synthetic materials.
Example: Rubbing alcohol.
Uses: surgical preparation, antiseptic, instruments.
Use undiluted (i.e., 50-70%).

Aldehydes:
The two most common disinfectants in this group are gluteraldehydes and formaldehyde. Gluteraldehydes are often combined with a synthetic detergent. These substances are irritating and cytotoxic, so their use is limited to disinfection, and instruments should be rinsed well before use. Exposure of 3 hours is required to kill bacterial spores. Formaldehyde is considered a carcinogen.
Examples: Wavicide™, Cidex™.
Uses: Glutaraldehydes may be used for cold pack sterilization, disinfection; formalin (40% formaldehyde in water) may be used to fumigate premises.
Recommended dilution ratio: Use gluteraldehydes undiluted (i.e., 2.0%) for disinfection; use formalin at 1-10% for fumigation.

Chlorhexidine:
This bisbiguanide compound acts on bacterial cell membranes, precipitates intracellular contents, and inhibits ATP (adenosine triphosphate, an energy source for cells--in this case the energy source of the bacteria). The cell membrane damage causes leakage of potassium and pentoses, which kills the bacteria, but also harms host cells. Can dilute in water or saline. The brand name Virosan™ contains alcohol, making it effective against pseudomonads; however, once mixed with water this solution is only effective for 3-4 days.
Example: Nolvasan™(2%), Virosan™.
Uses: Surgical preparation, wound treatment, disinfection.
Recommended dilution ratio: 1ml chlorhexidine + 39ml diluent (0.5%) for wounds, and 1ml chlorhexidine + 19ml diluent (1.0%) for disinfection.

Chlorine:
Chlorine-based products are oxidizers, releasing free radicals that destroy cells. These compounds indiscriminately attack microorganisms, organic matter and living tissue. Chlorine decomposes in the presence of light and has toxic fumes that can lead to chemical pneumonia and skin and eye burns. Good ventilation, eye protection and gloves are recommended when using Chlorines.
Examples: Clorox Bleach™, Purex™ (should be 5.25% sodium hypochlorite).
Uses: Disinfection of nonmetallic objects and surfaces.
Recommended dilution ratio: 1:32 (1/2 cup of 5.25% bleach per gallon diluent).

Stabilized Chlorine Dioxides
Stabilized chlorine dioxide is an inorganic compound of oxygen and chlorine and is a powerful oxidizing agent. Chlorine dioxides stimulate an oxidation process that safely breaks and eliminates sulfur bonds responsible for organic odor. Can be safely used around birds. It will clean and provide disinfectant protection and is not harmful. For hard surfaces, the solution is sprayed on and then wiped off after a 5 minute exposure. Rinsing is not necessary. Oxyfresh Dent-a-gene™ is a full strength stabilized chlorine dioxide disinfectant that is a two-part product. The two parts are mixed (at this stage it does have toxic fumes) but once stabilized it is safe for use. A mixed solution can be used for 7 days if sealed tightly and kept out of the light.
Examples: Bio-Rite™, DioxiCare™, Oxyfresh Dent-a-gene™, Oxyfresh Cleansing Gele™
Uses: Washing/soaking solution for syringes, food dishes, feeders and water containers; general disinfection of premises.
Recommended dilution ratio: Varies with product, follow label directions.

Cresols:
Cresols are wood tar distillates that have solvent and antibacterial properties. Commercial cresols available as disinfectants usually consist of pine oils combined with soap. These substances are often difficult to remove from surfaces and may leave a slick coating to floors or other surfaces.
Examples: Hexol™, Pine-Sol™.
Uses: Disinfection of premises.
Recommended dilution ratio: None listed in literature.

Iodophores:
These compounds consist of iodine complexed with surfactants or polymers. The most common compound is povidone iodine (iodine + polyvinylpyrrolidone), available as a solution and as a scrub. The detergent used in the scrub form is cytotoxic and should not be used on open wounds. The polyvinylpyrrolidone has a high affinity for cell membranes, delivering the iodine more directly to the target cells (e.g., bacteria), but it is the free iodine that contains the disinfectant action; therefore, dilutions of povidone iodine actually disinfect or kill infectious agents better than more concentrated solutions. Iodine kills bacterial spores if contact time is greater than 15 minutes.
Example: Betadine™ Solution and Betadine™ Scrub(10%).
Uses: Surgical preparation, wound treatment, hand cleansers, foot baths, disinfection.
Recommended dilution ratio: 1ml povidone-iodine + 99ml diluent (0.1%) for surgical preparation and 1ml povidone-iodine + 9ml diluent (1.0%) for wound treatment.

Phenols:
Phenols are cytotoxic by disrupting cell walls and precipitating cellular proteins. Some phenols have been shown to cause neurotoxicity and teratogenicity (birth defects) after long dermal exposure, so animals should be removed from the quarters during cleaning; the use of goggles and gloves is recommended. Phenols are extremely toxic to cats and may be toxic to reptiles.
Examples: Avinol-3™, Lysol™, One Stroke Environ™.
Uses: General disinfection, foot baths.
Recommended dilution ratio: 1/2 ounce One Stroke per gallon diluent.

Quaternary Ammonium Compounds (QAC):
QAC's are a form of cationic detergent, but they are not compatible with other soaps or detergents, and even the residues of these substances and/or organic matter will inactivate QAC's. Activity is increased, however, by the addition of ethanol. These compounds act by direct denaturation of bacterial enzyme systems and neutralization of acidic elements in the bacterial cell walls.
Examples: Roccal D™, Parvosol™, Quintacide™.
Uses: Some wound treatment, general disinfection.
Recommended dilution ratio: 1 part QAC to 2,500 parts diluent for wounds; 1 part QAC to 200 parts diluent for disinfection.

General Comment on Potential Environmental Toxins:
Many disinfectants and their fumes, especially at full-strength, may cause skin, eye and lung irritation, and may be toxic if ingested. Care should be taken to wear gloves while using these products, and to work in a well-ventilated area. Most chemical compounds, including disinfectants, some cleansers and even some drugs, must be accompanied by a material safety data sheet (MSDS) explaining the potential health hazards and how to prevent or treat exposure. These information sheets are usually packaged with the products, or can be obtained from the manufacturer. The Occupational Safety and Health Administration (OSHA), as well as most insurance companies, require that a complete file of appropriate MSDS's be kept on scene and readily available/accessible to all employees and volunteers.

In addition to human safety, care must be taken to prevent chemical exposure to wildlife. Animals should be kept away from all volatile chemicals at all times. This includes phenols, ammonia, bleach, and most common household cleansers. If these cleansers must be used, the animals must be removed from the room they are being used in until it has thoroughly aired. If any of these chemicals are used to disinfect cages, they must be thoroughly rinsed and air-dried to prevent toxin accumulation. Cigarette smokers should not smoke near animals, particularly amphibians. Note that many pesticides will cause severe illness or even death in many birds, reptiles and nearly all amphibians.

Table 2: Properties of Disinfectants

Property or Spectrum of Action	Phenol	QAC	Cresol	Alcohol	Iodo-phore	Chlor-ine	Alde-hyde	Chlor-hexi-dine	Chlor-ine dioxide
GM^+ bacteria	high	high	high	high	high	high	high	high	high
GM^- bacteria	high	high	high	high	high	high	high	mod*	high
Bacterial spore	none	none	none	none	mod	none	mod	none	mod
Chlamydia	none	high	none	none	?	low	?	none	?
Fungi & yeasts	low	mod	mod	mod	high	high	high	mod	high
Viruses	mod	var	mod	mod	mod	high	high	mod	high
Protozoa	low	mod	?	mod	high	none	?	low	high
Effectiveness w/organic matter	mod	low	mod	none	mod	none	var	mod	low
Residual action	high	high	high	none	low	none	low	high	low
Effectiveness in hard water	var	low	var	NA	high	high	high	none	?
Most effective PH range	acid	alk	acid	NA	acid/ alk	acid	acid	alk	?
Corrosiveness	high	none	mod	low	mod	high	none	none	low
Toxicity	high	low	mod	low	low	low	var	mod	low
Biodegradable	?	no	yes	yes	yes	yes	no[#]	no	yes

KEYS

mod = moderate

var = variable with formulation

? = unknown or conflicting data published

NA = not applicable

alk = alkaline

∗ Virosan™ brand is effective against pseudomonads; other chlorhexidines are **not** effective against pseudomonads.

[#] Wavicide™ brand name product is biodegradable.

Other disinfectant notes

- Phenols and aldehydes perform better at warmer temperatures
- Iodophores are only stable as long as dark color is maintained and may stain.
- QAC destroys chlamydia but is usually expensive.
- Alcohols evaporate rapidly and may require reapplication.
- Chlorines break down in light and solutions must be fresh. Chlorines are usually inexpensive.

Chapter 3 - BASIC REQUIREMENTS FOR HOUSING WILD ANIMALS IN REHABILITATION

3.1 Overview

Wildlife rehabilitators should be able to provide enclosures or cages of appropriate size made from appropriate materials that contain appropriate furnishings for all ages of all species that they commonly treat. The cage sizes recommended in this document are minimal, and the suggested materials work well for many rehabilitators. Alternative techniques for housing and pre-release conditioning are encouraged, but must meet basic natural history, comfort, and hygiene requirements. Assigning cage size strictly by species is not always realistic; variations in an individual's size due to race or age, and variations in an individual's behavior due to age and season, will affect appropriate cage size. Dimensions can be modified to accommodate special needs of the facility or the individual animal and new advancements in the field.

Minimum standards for enclosures are based on common sense. All enclosures should be structurally sound, constructed of materials appropriate for species housed, maintained in good repair, and designed to protect the animal from injury, abuse, or harassment while containing the animal and restricting the entrance of other animals. Enclosures should provide sufficient shelter from overheating, excessive rain, snow, or cold temperatures. Each animal should be able to turn about freely, and lie or sit comfortably, unless medically restrained. The construction material should be of sufficient strength, and be of a nonporous, waterproof finish (when reasonable) to facilitate cleaning and disinfection.

The facility should have reliable and adequate potable water and electricity. Food and bedding should be stored in an appropriate manner that protects it from spoilage, infestation and contamination. Waste should be properly disposed of in accordance with all regulations, in a manner that minimizes vermin infestation, odors, and disease hazards. The facility should provide fresh air in a manner that avoids drafts, odors, and water condensation, and provides auxiliary ventilation when ambient temperature exceeds 85°F. Lighting should be adequate to allow for inspection and cleaning, while not stressing animals. Full spectrum lights may be necessary. The facility should be sufficiently drained to protect against sewage back up in traps and to rapidly eliminate water accumulation.

An effort should be made by the rehabilitator to obtain as much information as possible on each species admitted through reference and natural history literature and contact with other rehabilitators familiar with the species. Through an understanding of each species' behavior and natural history, proper choices can be made to provide suitable cage habitats.

All rehabilitators should be prepared to provide ***temporary*** housing for any species they are likely to encounter—including those species rarely encountered, and/or for which they are not currently licensed to treat. These animals should be transferred within 24 hours to another rehabilitator or facility that is both properly licensed and equipped for their care.

Many indoor and outdoor cages can be constructed for multispecies use. These cages can be quickly modified to accommodate different species through substituting different perches or other furnishings. Thus, a separate cage is not needed for each species the rehabilitator intends to treat, but cages should be able to be adequately disinfected and adapted to meet the minimum standards required for the species.

Many young animals (e.g., fledgling crows or infant raccoons) should be group-housed with conspecifics to avoid imprinting on and/or socialization to humans. When foster parents are available, young birds (when possible) should be transferred to facilities having those foster parents. Efforts should also be made to network with other rehabilitators to place individual (single) young animals with others of its own species.

When birds are developed sufficiently to perch or mammals to ambulate, cages meeting adult requirements are necessary. These adolescents may be more "behaviorally comfortable" being group-housed with conspecifics. Group-housing is not always feasible or the best option for adults. The natural history and seasonal behavior of the species are factors to consider before housing adult animals together.

Housing design must provide for the safety of both humans and animals. In addition to the above, some important considerations include:

- Avoid areas where animals can become tangled or trapped
- Avoid sharp edges or points (inside and outside cages)
- Allow for "running" distance for both human and animal, including hiding boxes
- Ensure proper footing by using flooring with good drainage
- Avoid ledges that can be used as unintended perches
- Secure all cages with appropriate locks
- Use food trapdoors if possible to minimize interaction

3.2 Cage Size Criteria Based on Medical Status

Appropriate cage space is conditional to the species, the behavior of the individual, the nature of the injury, and the specifics of treatment and recovery. Recommended cage dimensions are based on approximations of space requirements during three recovery periods, each defined by the activity level required of the patient(s). These levels are restricted activity/mobility, limited activity/mobility, and unlimited activity/mobility.

The following paragraphs describe the three activity levels and the caging best suited to them. Housing/caging should allow recovering animals the prescribed amount of self-imposed activity or supervised/forced activity during rehabilitation. Prescribed activity can be linked with cage size based on species and stage of recovery. Indoor caging is replaced by outdoor caging as the animal progresses through the rehabilitation process. Animals requiring large expanses of water (for example, grebes, loons, pelagic birds, and many marine mammals) present some challenges to wildlife rehabilitators and this set of activity descriptions; these descriptions may not apply directly to such species.

3.2.1 Restricted Activity/Mobility

Restricted activity/mobility means to hold an animal within a space small enough to restrict almost all movement, but to provide enough room for the animal to maintain a normal alert/upright posture and to stretch its body, limbs and tail, but not enough to leap, fly, or run. The enclosure should be small enough to facilitate easy capture, thereby minimizing capture stress and the possibility of injury during repeated periods of capture and treatment. Young mammals and birds confined to their nest prior to weaning and fledging are included in this category.

Conditions requiring restricted activity include rehydration, hypothermia, bandaged wing, or leg injury to mammals. Any animal with severely debilitating conditions such as shock, toxicity, neurological impairment, or other conditions that require close supervision and management should be considered as restricted activity patients.

Restricted activity areas are provided by incubators, veterinary cages, kennel carriers, and other small enclosures. Perches close to the cage floor (relative to the size of the bird) and/or walk-ups to perches should be provided depending on equilibrium and/or injury. Hiding areas such as boxes or towels must be provided for those species with more reclusive behavior such as raccoons, wrens, and rat snakes. Limited access to tubs or small pools might be provided to semiaquatic or pelagic species when the injury permits. Restricted activity is maintained primarily indoors in northern temperate areas.

3.2.2 Limited Activity/Mobility

Physical therapy and/or acclimatization comprise the next phase of the rehabilitation process once the anatomical and/or physiological problem has been corrected. Movement is now encouraged as part of the healing process. This physical therapy may be voluntary and/or forced by care-givers.

Limited activity/mobility is when restriction of the animal's movement is no longer necessary due to ongoing treatment, but periodic capture and medical treatment may still be necessary. These enclosures are also used for fledged birds and weaned mammals. Outdoor caging should provide the opportunity for short flights or walks/runs. Perches and walk-ups to perches (birds) or hiding areas and nest boxes (all animals) are appropriate furnishings. Semiaquatic and pelagic species should have access to tubs or pools of water for exercise. Creance flying may be appropriate physical therapy during this phase.

3.2.3 Unlimited Activity/Mobility

Unlimited activity/mobility uses large and complex outdoor caging. These enclosures provide physical and psychological conditioning or reconditioning through extended flights for birds and walks, runs and/or climbs for mammals. This housing should allow animals to improve their strength, develop stamina and coordination, restore muscle tone, and acclimate to ambient weather conditions. Physical therapy should be primarily voluntary although some may be forced by care-givers. Unlimited activity caging should be used to condition fledged birds and weaned mammals for release. At least two perches should be provided for birds. Hiding areas and nest boxes should be provided for all animals. Large pools of water should be provided for aquatic species. Creance flying may be appropriate physical therapy during

this phase as well. Please see notes on raptor housing for more specific details on how creance conditioning relates to cage size.

3.3 Natural History/Behavior

The natural history and behavior of any species must be considered in the enclosure design process. Not only does the enclosure provide for security and animal safety, it provides habitat in which the animal can learn or relearn behaviors specific to that species. Caging should provide animals undergoing rehabilitation the opportunities necessary for complete recovery from injuries and/or for learning and practicing vital behaviors such as foraging or hunting.

Cage design and furniture should address and encourage species-specific patterns of foraging, play, rest or sleep, hiding or predator avoidance, and social responses to conspecifics or cage mates. For example, many species such as crows and raccoons respond well to toys, hides, pools, climbs, and other species-appropriate enhancements. Other species, such as mourning doves and opossums seem to benefit less from such curiosity enhancements; however, even these species have been observed using these items over time. Suggestions for appropriate habitat furnishing can be found in the specific housing sections which follow, and in the reference material in Appendix C.

Animals should be fed palatable, nutritionally balanced food in a form and presentation appropriate to their natural behavior and their medical condition. Diets are highly specialized and specific dietary needs may vary from one individual to another; for this reason, a veterinarian or veterinary nutritionist should be consulted before formulating any new diets or adding vitamins or other supplements to existing diets. Some species may show strong preference to a specific food item, so efforts should be made to provide a varied diet and regularly monitor food intake and changes in body weight.

3.4 General Indoor Caging/Housing

Minimizing stress experienced by animals in rehabilitation is a key factor in the design of indoor enclosures. All indoor caging should be located in an area that provides quiet and minimal visual stimuli. Specific suggestions to minimize stressors are to cover cage doors, provide visual barriers, position cage fronts away from human activity, remove radios, and place the enclosures far from high traffic areas. When possible, natural daylight should be provided. Full-spectrum (UVB, UVA, visible light, and infrared) lighting should be used when natural lighting is not feasible. Some products are advertized as “full-spectrum” while only providing the full visible spectrum. The need for full-spectrum light can vary by species; for example, snakes do not require UVB light. Any artificial light source should be timed to mimic current seasonal daylight cycles.

3.5 General Outdoor Caging/Housing

Animals undergoing rehabilitation are generally housed in outdoor enclosures prior to release. Large, outdoor caging provides opportunities for exercise, behavioral rehabilitation, and acclimatization to weather conditions, while smaller outdoor caging may be used for short periods prior to this release conditioning.

The philosophy dictating cage size presupposes normal recovery times for the patient. None of the restricted or limited activity sizes is recommended for extended or permanent care. Housing for animals kept permanently (e.g., for educational, exhibit or captive-breeding purposes) is not addressed in this document, but can be found elsewhere *(see Appendix C).*

Special consideration must be made in the design of outdoor enclosures to provide adequate shelter, safety, and proper habitat for animals in rehabilitation. Enclosures should be made secure against local predators, including adequate perimeter control; for example, a cement floor and foundation or ½-inch galvanized hardware cloth buried under the cage floor and extending two feet up the walls may be considered adequate protective design. Enclosures and their contents should duplicate natural conditions wherever practical. Cage design should provide for ease of cleaning, proper ventilation, adequate light, and temperature control. Proper substrates and furnishings appropriate for each species should also be provided in each cage. Fresh water for drinking and/or bathing must be available in each enclosure.

Each outdoor enclosure should possess an area that provides necessary protection from the elements, yet still enables the animal to be conditioned for survival in the wild. All cages should have a roofed portion or contain a nest box or other means of protection from inclement weather. Feeding areas (and the food within) should be protected, as well. Protection from the wind and weather should also be provided on the north side of enclosures. In northern climates, roofs and doors should be constructed to withstand the weight and depth of snowfall.

Outdoor enclosures ideally protect the animal without habituating it to human activity. To avoid habituation to humans or even taming, cages should be surrounded by a fence or somehow placed out of view of the general public. As in the design of indoor enclosures, minimal human contact, both visual and auditory, is preferable. Domestic animals and other potential predators should be prevented from contacting animals in rehabilitation, as predator avoidance is an important factor in survival of rehabilitated animals. Consideration of these variables when designing outdoor enclosures is vital for proper rehabilitation of wildlife.

Outdoor caging alone may not be adequate for full conditioning of certain species and/or certain injuries; for example, the flight conditioning requirement for successful release of a peregrine falcon recovering from a shoulder fracture may exceed that provided by any caging. The large cages or deep pools necessary for proper conditioning of some species are not available to all wildlife rehabilitators. In many instances, cooperation with other rehabilitators or wildlife professionals may ultimately be the most successful strategy an individual rehabilitator can choose. Working with licensed falconers to provide pre-release training or transferring patients to other rehabilitators with more appropriate caging are suitable substitutes for the conditioning cages (unlimited activity) recommended below. The successful release and continued survival of rehabilitated animals is the goal of rehabilitators; networking to share information, skills and equipment is vital to the success of rehabilitation.

Chapter 4 - AVIAN HOUSING REQUIREMENTS

4.1 Overview

4.1.1 General Avian Housing Considerations

Enclosure dimensions are based on materials as well as species requirements. Exterior plywood is available in economical and easy-to-use 4-foot by 8-foot sheets and some caging dimensions have been calculated using numbers that are based on this material size. Maximum volume is achieved with cubic cages, and this fact is considered when determining cage dimensions. Enclosure design varies widely depending on materials used, climatic conditions, species housed, and many other considerations. While considerable thought and experience was employed to structure the cage sizes listed in Tables 3-5, it is beyond the scope of this document to list all possibilities in terms of material, design, or size.

Cage sizes specify minimums and are calculated for the species at different stages of rehabilitation. Intelligent substitution of height and ground area requirements is encouraged; for example, while pheasants and egrets are the same size, one requires ground space while the other needs height. Substitutions resulting in larger sized or differently shaped cages are encouraged.

Multiple occupancy by **compatible** species is not only acceptable but beneficial, particularly in conditioning (unlimited activity/mobility) caging for fledgling birds. Individuals of certain other species (e.g., herons, titmice, woodpeckers, etc.) may be extremely aggressive and may require individual housing.

4.1.2 Construction Materials

Many different types of construction materials for avian enclosures are used in rehabilitation. Selection of appropriate material is important for the proper construction of adequate enclosures. In general, aviaries should have a double-door entry system (not always necessary for birds less apt to fly in confined areas, such as waterfowl and seabirds). Solid walls for aviaries can be constructed of wood, fiberglass, or an equivalent. Hardware cloth, chicken wire, and chain-link fencing are not recommended if the birds can come into direct contact with them; these products may be used if appropriate netting or screening is used on the interior surface. If vertical wood lath, fiberglass screening, or netting prevent direct contact, wire can add extra security, and may be used as the external material for most cages.

4.1.3 Flooring Considerations

Flooring for aviaries varies with types of birds. Substrates, such as sand or pea gravel, should be changed as often as necessary, and biannually at a minimum. Natural flooring is acceptable in very large enclosures. This natural flooring must be turned over and disinfected on a regular basis, depending on the number and size of birds housed in the enclosure. Flooring substrates for small cages include towels, paper towels, raised netting over newspaper, newspaper alone, or dried pine needles. [Note: dried pine needles are not appropriate for ground-foraging birds such as doves, as crop rupture has been noted when these birds ingest the pine needles.] The selection of substrate is dependent on the species being housed.

4.1.4 General Avian Furnishings

Many types of cage furnishings are appropriate for birds undergoing rehabilitation. Bath pans or pools should be provided for all birds whose medical condition does not prohibit them from getting wet (e.g., bath pans are usually contraindicated for birds with wing wraps or foot bandages or for birds with neurologic deficits). When perching is required (see Tables 3-5), each cage should have a minimum of two perches for birds capable of perching. Waterfowl and seabirds will have different “perch” requirements. Perches and all surface substrates (including those on floors and perches) should be customized to the appropriate size and material for the species using them. Appropriate size and substrate will vary with the natural history of the species (e.g., limb-perchers vs. ledge perchers) and should be designed with the goal of minimizing foot damage. Outdoor caging should contain some sort of nest box for cavity nesters or sheltered area for other birds. Nest boxes and shelters provide a natural space that reduces stress and enhances security.

4.2 Housing for Songbirds

4.2.1 General Songbird Housing Considerations

The songbird (passerine or perching) group of birds includes a large number of individual species with wide ranges in size, behavior, habitat, foraging techniques, food items, and subsequent rehabilitation requirements. These requirements must be understood and addressed to ensure successful rehabilitation and eventual release of healthy, well-adapted individuals that are prepared for survival in the wild.

Understanding the natural history of any species in rehabilitation is necessary when considering caging arrangements. Songbirds have many natural predators such as hawks, owls, other birds, snakes and small mammals, as well as domestic animals associated with man (cats and dogs). Care should be taken to reduce exposure of these birds to potential predators, thereby reducing stress and/or potential injury. While some species may be housed together within this group, especially when young, some species such as jays and crows are predators of other species. Songbirds which are seed-eaters or omnivores have characteristic heavy beaks with the capacity to harm birds with much smaller insectivorous beaks. Certain other species, such as tufted titmice and vireos, can be aggressive towards other birds, including their own species.

The requirements for pre-release conditioning (unlimited activity) caging vary greatly among songbird species. White-breasted nuthatches, bushtits and titmice generally fly straight from their nests, requiring very little pre-fledge training. Larger birds, such as robins, mockingbirds and jays, leave the nest early, and spend a lot of time on the ground while developing flight feathers. During this time, the fledglings follow the adults and learn appropriate survival behaviors. Larger songbirds require exercise and practice to fly well so a larger aviary is recommended to house these species.

4.2.2 Construction Materials

External wire on outdoor caging for songbirds should be ½" x ½" galvanized hardware cloth. The use of chicken wire or chain-link is not recommended, as the large openings allow predator entry or accidental escape of cage inhabitants if the interior lining becomes torn or

loosened. Interior walls should be lined with screening or a very fine-meshed netting, such as shade-cloth. Mesh size is important, as large mesh may allow songbirds to catch toenails or even toes in the netting. Fiberglass screening is acceptable for most songbirds, but will not withstand the pecking behavior of titmice, jays, woodpeckers, and some other species. Wire screening has been used successfully without causing damage to feathers.

Selection of surface material depends on the natural history of the species being housed. No wood surfaces should be exposed in cages for Piciformes, as they will destroy these surfaces. Interior surfaces may be lined with metal or plastic siding, and may prevent the birds from climbing (thereby preventing feather damage). PVC pipe, reinforced with rebar inside, makes effective, indestructible cage framing and perches for larger woodpeckers.

Floors of both indoor and outdoor cages should be composed of or covered with appropriate substances to prevent slipping (splay leg) and/or bumblefoot. Suitable substrates to improve footing include, but are not limited to, newspaper, towels, paper toweling, foamy plastic shelf liner, sand, Astroturf™, and parasite-free dried pine needles. [Note: dried pine needles are not appropriate for ground-foraging birds such as doves, as crop rupture has been noted when these birds ingest the pine needles.]

4.2.3 Furnishings

Understanding the natural history of the species being rehabilitated, and then adapting the aviary accordingly for that species, can give the bird(s) a great advantage when released. Woodpeckers do well when raised with hollow logs for a nest; bushtits, on the other hand, are raised very well when they have a hanging sock for a nest and food is provided for them to find on tree branches and leaves throughout their aviary. Cavity dwellers/nesters should be provided with some sort of hide box or cavity-type container. Aviaries that are furnished with natural plantings help reduce stress and provide the birds with natural shading, perching, hiding, and foraging opportunities.

Table 3: Minimum Housing Guidelines for Songbirds & Misc. Avian Orders

Note: This table is not intended to be used independently; it should be used only in conjunction with the information in Chapter 4, Sections 4.1and 4.2

Order	Length of Bird	Restricted Activity (WxLxH)	Limited Activity (WxLxH)	Unlimited Activity (WxLxH)	Max#	Codes
Columbiformes (Pigeons, Doves)	>9"	12"x12"x12"	12"x12"x12"	16'x8'x8'	8 12	P, Pi, Q
Cuculiformes (Cuckoos)	<12"	18"x18"x18"	24"x24"x24"	8'x8'x8'	4-6	P, Q
	>12"	24"x24"x24"	36"x36"x36"	16'x8'x8'	4-6	P, Q
Caprimulgiformes (Nighthawks, Goatsuckers)	~9"	12"x12"x12"	12"x24"x12"	8'x16'x8'	6	C, P
Apodiformes						
Apodidae (Swifts)	<9"	12"x12"x12"	12"x12"x12"	8'x16'x8'	15-20	B, Ch
Trochilidae (Hummingbirds)	<5"	7"x11"x5"	12"x17"x7"	2'x4'x6'	4	P, Z
Coraciiformes (Kingfishers)	<9"	12"x12"x12"	18"x18"x18"	8'x16'x8'	4	C, F, Pi, S
Piciformes (Woodpeckers)	<9"	12"x12"x12"	18"x18"x18"	4'x8'x8'	2-4	C, D, H, W
	>9"	18"x18"x18"	24"x24"x24"	8'x16'x8'	2-4	C, D, H, W
Passeriformes						
(Perching	<5"	7"x11"x5"	12"x17"x7"	2'x4'x4'	4	H, P, Z
& Songbirds, Swallows)	>5"	12"x12"x12"	18"x18"x18"	4'x8'x8'	4-6	H, P, Z, W
Corvidae	<17"	14"x18"x18"	24"x18"x24"	8'x16'x8'	6	P
(Crows, Ravens & Magpies)	>17"	16"x22"x22"	24"x24"x24"	10'x30'x15'	6	P
Galliformes	<20"	2'x2'x2'	3'x3'x3'	4'x4'x8'	4	H
(Quail, Pheasants)	>20"	3'x3'x3'	4'x4'x8'	8'x12'x8'	4	H

(WxLxH) = Listed in order: Width x Length x Height
~ = approximately
< = less than
> = greater than
" = inches
' = feet
Max# = Maximum recommended number of conspecifics housed in “Unlimited Activity” enclosure; actual number will vary with season, age and temperament of the individual birds.

Codes for Special Housing Requirements Used in Table 3, Songbirds & Misc.

B Special vertical surfaces needed for swifts. Temporary confinement and recovery housing must be lined on all sides with a snag-free fabric or other material with enough texture for the birds to cling vertically. Two or more walls of the conditioning housing must be constructed of or covered with a roughly-textured material such as cork, rough-textured siding or fiberglass window screening.

C Birds such as woodpeckers and nuthatches require angled and/or vertical logs for climbing, and hollow logs for hiding/nesting. These logs also help to maintain beak and foot health, and allow the birds foraging experience as they hunt for ants, grubs, etc. Birds such as kingfishers and nighthawks require large, horizontally level, elevated logs for perching.

Ch A waist-high "artificial chimney" should be located in the center of the outdoor housing as a feeding station or roost; suggestions for construction may be found in Kyle, P. and G. Kyle, 1995.

D Birds with this designation require old logs, etc., as drumming materials.

F Special substrate needed. These species are susceptible to foot problems. Depending on the species, padded flooring, towels, linens/sheeting, carpets, natural kitty litter (no additives), or sand may be used.

H Hides; provide natural vegetative material or human-devised areas for cover. (All birds will benefit from an area of cover.)

P Requires two or more perches of varied diameter; materials may be natural branches, hemp or sisal rope from ¼" to ¾" diameter, dowel rods covered with self-adhering wrap (such as Vetrap™ 3M, St. Paul, MN), or other suitable substances (such as rubber drawer-liners). Varied substrates, diameters and locations allow the bird choices and minimize captivity-related foot problems.

Pi Piling or shelves required for perching; these should be covered with Astroturf™ or other suitable material to provide good footing and prevent bumblefoot lesions.

Q Quiet and extreme privacy required (very prone to stress).

S Bathing area required; "kiddie pool" size.

W Large pan with soil, leaves, grass and/or wood chips containing live worms, grubs, mealworms and/or insects to allow the birds to forage on their own. May not be required for all species in the orders listed - check natural history requirements.

Z Although larger conditioning cage sizes may be preferred, great care must be taken to seal off small openings or cracks that can act as traps.

4.3 Housing for Waterbirds

4.3.1 General Waterbird Housing Considerations

Waterbirds, as the name implies, are those birds that spend much of their time in, on or around the water. These birds all require some sort of pool in their outdoor (unlimited activity) caging. The size of the pool varies greatly from species to species and with the individual injury. The natural feeding, drinking, and bathing behavior of each species should be considered in the design of the pool, including depth of the water for swimming, bathing, and drinking. For example, sandhill cranes dip and scoop to drink water, so this species requires a water bowl with a minimum diameter of 12" and a minimum depth of 5".

The cage sizes recommended in this manual are minimums. Every bird would benefit from as large a flight area as possible and the rehabilitator is encouraged to construct larger cages whenever reasonable. The recommendations throughout the *Minimum Standards* have been tried by experienced rehabilitators and shown to be the minimums acceptable for safe and effective rehabilitation of the species indicated. Remember that large cages intended for animals with greater space requirements can be designed to be subdivided or furnished for other species when needed.

4.3.2 Construction Materials

Construction materials for aquatic birds are similar to those required for most other avian species. All materials should be easy to clean and disinfect. Use materials that are impervious to water or that can be sealed to become impervious. Materials utilized for walls should provide visual barriers, minimize chances of injury, provide adequate ventilation, and protect against predators and domestic animals. Pool materials include galvanized metals, plastics, fiberglass, cement and natural ponds. Any sharp or abrasive areas should be covered to prevent injury and substrates should be appropriate to prevent injuries to feet, e.g., matting, on flat surfaces such as cement, wood or fiberglass.

Most waterbirds spend the majority of their time in or near large bodies of water and are conditioned to seeing open sky overhead; thus, the majority of the roof on an outdoor cage should be open, allowing for a clear view of the sky. Netting works well for this application, and will prevent injury from collisions if the birds fly upwards. This type of construction is psychologically beneficial to the birds, and it encourages them to exercise.

Many of these birds are colonial foragers and nesters. Group housing for species that are colonial waterbirds may reduce stress while in captivity. A precise knowledge of the species' natural history will help in determining if the birds in rehabilitation are too territorial for group housing, or what the optimum number of individuals might be for any given enclosure dimensions.

4.3.3 Furnishings

Some factors in successful habitat construction are species-specific:

- Frigatebirds have some unique problems worth considering when housing them for rehabilitation. Their tail and primary feathers are long and fragile, requiring that they have tall

pens and perches that will keep their tails off the floor. In addition, although frigatebirds naturally feed and drink on the wing, if they land on the water, they are unable to take off and will drown. For this reason, pools should not be used in their cages, and long flight cages are needed for sufficient exercise.

- Gannets, loons and other diving species require deep pools and often will not even enter a shallow pool such as a kiddie pool. Rocks or short pilings for perches are required for gannets and some other divers, but should never be used for loons and grebes as these types of perches are too high and would cause keel damage if used. If waterproof, loons and grebes will remain in the water rather than perch; if not waterproof, netted floats or padded haul-out areas should be provided for these species.
- Cranes require tall cages to prevent head trauma as they tend to jump rapidly upwards. Some cranes bathe regularly, requiring pools up to 10" in depth. Because they are wading birds, the depth should be graduated.
- Terns and Oystercatchers will fly over and feed off of water, but they do not float or bathe in deep water. These species benefit from graduated pools, with the depth proportionate to their size (e.g., shallower for smaller terns).

Table 4: Minimum Housing Guidelines for Waterbirds

Note: This table is not intended to be used independently; it should be used only in conjunction with the information in Chapter 4, Sections 4.1 and 4.3

Order	Restricted Activity (WxLxH)	Limited Activity (WxLxH)	Unlimited Activity (WxLxH)	Codes
Gaviiformes				
Loons	15"x30"x30"	3' x 3' x 3'	Pool: 8' diam, 2' deep 2 birds maximum	N, PT, PP, SO
Podicipediformes				
Small grebes (Eared, Horned & Pied-billed)	12"x12"x12"	18" x 18" x 18"	Pool: 6' diam, 2' deep 4 birds maximum	N, H, PT, PP, SO
Large grebes (Western, Clark's & Red-necked)	18"x18"x18"	2' x 2' x 2'	Pool: 6' diam, 2' deep 4 birds maximum	N, PT, PP, SO
Procellariiformes				
Storm-petrels	12"x12"x12"	18" x 18"x 18"	Pool: 45" diam, 8" deep 5 birds maximum	N, PT, PP, SO, AG
Large petrels, Fulmar & Shearwaters	18"x18"x18"	3' x 3' x 2'	Pool: 6' diam, 12" deep 2 birds maximum	N, PT, PP, SO, AG
Albatrosses	3' x 3' x 3'	4' x 6' x 4'	Pool: 10' diam, 18" deep 2 birds maximum	N, PT, PP, SO, AG
Pelecaniformes				
Pelicans (Brown)	3' x 3' x 3'	4' x 8' x 4'	Aviary with Pool: Aviary: 12' x 30' x 10' Pool: 10' diam, 2' deep 6 birds maximum	PT, AP, SO
Pelicans (White)	4' x 4' x 4'	4' x 8' x 4'	Aviary with Pool: Aviary: 12' x 30' x 10' Pool: 10' diam, 2' deep 4 birds maximum	PT, AP, SO
Gannets, Boobies, Cormorants, Anhinga, Frigatebirds & Tropicbirds	3' x 6' x 3'	4' x 8' x 4'	Aviary with Pool: Aviary: 8 'x 16' x 8' Pool: 8' diam, 2' deep 6 birds maximum	PT, AP, SO, ST

Order	Restricted Activity (WxLxH)	Limited Activity (WxLxH)	Unlimited Activity (WxLxH)	Codes
Ciconiiformes				
Bitterns, Herons & Egrets * < 20"	18" x 18" x 18"	2' x 2' x 2'	Aviary with wading pool: Aviary: 4' x 12' x 8' Pool: 2-3' diam, 6-10" deep 2 birds maximum	AW, AG
Bitterns, Herons, Egrets, Storks, Ibis & Spoonbill * > 20"	3' x 3' x 3'	4' x 8' x 4'	Aviary with wading pool: Aviary: 10' x 25' x 10' Pool: 2-3' diam, 6-10" deep 4 birds maximum	AW
Anseriformes				
Swans	4' x 4' x 4'	4' x 8' x 4'	Aviary with wading pool: Aviary: 12' x 20' x 8' Pool: 8' diam, 2' deep 3 birds maximum	PT, AP
Geese	3' x 3' x 3'	4' x 6' x 4'	Aviary with wading pool: Aviary: 10' x 18' x 8' Pool: 6' diam, 2' deep 6 birds maximum	PT, AP
** Marsh Ducks & Whistling Ducks (dabblers)	18" x 18" x 12"	2' x 2' x 2'	Aviary with wading pool: Aviary: 6' x 10' x 8' Pool: 45" diam, 8" deep 3 birds maximum (up to 5 teal)	ON, PT, AP
♀Bay Ducks, ♋Sea Ducks & Mergansers (divers)	18" x 18" x 12"	2' x 2' x 2'	Pool: 6' diam, 2' deep 2 birds maximum (up to 4 buffleheads)	N, PT, PP, SO
Gruiformes				
Cranes	3' x 3' x 4'	4' x 8' x 8'	Aviary with Wading Pool Aviary: 10' x 25' x 10' Pool: 4' diam, 4-10" deep 4 birds maximum	AW
Rails * < 10"	12" x 12" x 12"	18"x 18" x 18"	Aviary with Wading Pool Aviary: 4' x 6' x 6' Pool: 3' diam, 3-5" deep 4 birds maximum	H, AW, FP

Order	Restricted Activity (WxLxH)	Limited Activity (WxLxH)	Unlimited Activity (WxLxH)	Codes
Rails, Gallinules & Coots * > 10"	18" x 18" x 18"	2' x 2' x 2'	Aviary with Wading Pool Aviary: 4' x 8' x 8' Pool: 45" diam, 8" deep 3 birds maximum	H, AW, FP
Charadriiformes				
Phalaropes	12"x12"x12"	18"x18"x18"	Aviary with SMALL land area (ledge) Pool: 45" diam, 6-8" deep 5 birds maximum	FP, PT, PP, SO
Sandpipers, Plovers & Shorebirds * < 10" (excluding Phalaropes)	12"x12"x12"	18" x18"x18"	Aviary with Wading Pool Aviary: 4' x 6' x 6' Pool: 3' diam, 1-3" deep 6 birds maximum	AW, FP
Sandpipers, Shorebirds & Avocets * > 10"	12"x18"x18"	2'x2'x18"	Aviary with Wading Pool Aviary: 4' x 8' x 8' Pool: 3' diam, 3-5" deep 6 birds maximum	AW, FP
Gulls & Terns * < 14"	12"x15"x18"	18" x18"x18"	Aviary with Pool Aviary: 6' x 12' x 8' Pool: 45" diam, 10" deep 6 birds maximum	PT, AP, SO
Gulls, Terns, Skimmers, Oystercatchers, Jaegers & Skuas * > 14"	18"x18"x18"	2'x2'x2'	Aviary with Pool Aviary: 8' x 16' x 8' Pool: 45" diam, 12" deep 4 birds maximum	NO, PT, AP, SO
Auks (Alcids) * < 12"	12"x12"x12"	18"x18"x18"	Pool: 6' diam, 2' deep 4 birds maximum	N, PT, PP, SO
Auks (Alcids) * > 12"	12"x18"x18"	2'x2'x2'	Pool: 6' diam, 2' deep 4 birds maximum	N, PT PP, SO

(WxLxH) = Listed in order: Width x Length x Height
diam = diameter
***** This measurement represents the length of bird from tip of beak to tip of tail with neck fully extended
****** These include: black, gadwall, mallard, pintail, wigeon, wood, shoveler, teal
♋These include: scoters, eiders, harlequin, oldsquaw
♌These include: canvasback, redhead, ring-necked, scaups, goldeneyes, bufflehead, ruddy

Codes for Special Housing Requirements Used in Table 4, Waterbirds

AG Note that these birds can be extremely aggressive, even with conspecifics. Use caution and observe the birds' interactions when introduced, before housing together unattended.

AP These birds require pre-release conditioning (unlimited activity) aviaries that contain pools to swim in and standing/perching surfaces.

AW These birds require pre-release conditioning (unlimited activity) aviaries that contain shallow wading pools and a variety of perches, especially up high.

FP These birds have very sensitive feet. Provide as much wading area (in addition to "swimming" pool) as possible in Limited and Unlimited Activity housing to help prevent husbandry injuries.

H Hides; provide natural vegetative material or human-devised areas for cover.

N Should be housed on tightly stretched, suspended netting as a substrate whenever bird is not in water.

ON When an individual of these species is housed inside and is emaciated (pronounced keel) or not standing, it should be housed on net bottom caging to protect feathers and keel until standing normally and of normal weight. Otherwise, when standing normally and keel is not extremely pronounced, housing substrate is solid and covered with toweling or matting.

PP These species, during pre-release conditioning, require only pool space. Prior to release, individuals must be able to stay in pool full time, without a haul-out area for a minimum of 48 hours without compromise to their waterproofing.

PT During recovery, bird should be allowed pool time as long and as often as medical condition allows (minimum kiddie pool size). This may include cold or warm water pools as appropriate for individuals.

SO Surface overflow of pool required to maintain water quality (this can be achieved by constantly running a hose or by overflowing pool, filtering and recirculating water).

ST As soon as they are standing, these stiff-tail-feathered birds should have a stump or stump-like perch to avoid breakage and soiling.

4.4 Housing for Raptors

4.4.1 General Raptor Housing Considerations

Sizing for raptor housing is based on a combination of the size and flight styles of the bird. While the cage information states a minimum rectangular size (Table 5), it has been found that an L-shaped enclosure will often be better to evaluate flight and angling abilities. As with other caging, the rehabilitator is encouraged to expand and enhance these minimum requirements, and create caging most suitable to their location, facility, caseload, and experience, keeping in mind the natural behavioral and physical needs of the birds.

The needs of raptors present several challenges to acheive successful release. Generally, these birds are large predators that hunt on the wing. Appropriate conditioning is crucial not only for foraging, but for territory defense and other behaviors. Thus, it is strongly recommended that the cage dimensions listed be followed or increased. Certain species, such as the bird-catching peregrine falcon, may require additional care. Hacking for nestlings, falconry exercise for better evaluation after injury, hunt training and conditioning may be necessary for some species. Creance flying may be used for evaluation and conditioning. Hunt training or live prey testing should be arranged when hunting ability is questionable, except for those birds hacked out or fostered into nests. Creance flying should not take the place of hunt training. Guidelines found in “Reconditioning Raptors: A Training Manual For The Creance Technique” (Arent, L., University of Minnesota Raptor Center, 2000) are recommended.

Rehabilitators using a flight cage, creance flying, or evaluating a patient’s progress throughout its exercise program, should apprentice under an experienced rehabilitator or falconer. A minimum of six months is recommended for apprenticeship; also recommended is attendance at a skills seminar on the proper use of each technique and methods for evaluating flight parameters. The wildlife rehabilitator should be aware that not all falconers will be able to provide useful instruction in the use of creance flying, as it is used very differently in rehabilitation than in falconry. Even if creance flying is being used, it is strongly recommended that conditioning cages of the referenced size either be used on-site or be found through networking with other rehabilitators or rehabilitation facilities. Raptors in stages immediately prior to release often need more exercise than can be provided on a creance. Movements up to perches, down to feed or water, or across to another perch also provide important exercise.

4.4.2 Construction Materials

Outdoor raptor facilities are most commonly constructed of wooden slats and/or solid sheets of wood. Chain link has been used successfully as roofing material, and can be used as an outer wall (outside of vertical barring) as a predator double wall. Other wire should only be used as a double wall outside of vertical slats; no wire should be used on walls where the bird might be able to cling or climb.

High stress raptors such as kites and accipiters should be housed in facilities adequate to the climate and that eliminate or minimize visual and auditory stress. Solid-sided walls and/or vertical slats with no more than one-inch gaps may be advisable. When secluded cages are not available, or when additional visual occlusion is necessary, translucent material (e.g., bed linens/sheets) may be hung on the outside of the slatted cage. These materials allow some

light to enter the enclosure, and slits or holes in the material allow for better ventilation than solid-sided cages.

4.4.3 Furnishings

Raptors require furnishings that are exceptionally sturdy and easily cleaned. All perching substrates must be chosen carefully based on the natural history and size of the species as well as the climate of the area (e.g., hemp or sisal rope rots very quickly in humid environments). Natural limbs (with bark), bow, block, and ring perches are appropriate for certain species of raptors. At least two perches should be placed in each cage, preferably at different heights and different angles. More than one surface substrate should be offered on the perches in each cage. Perches can be wood doweling or plastic piping (or the equivalent) covered by ¼-inch-pile Astroturf™, hemp, cocomat, or indoor/outdoor carpeting. Perches should have some degree of "give" for landings. Platforms, such as those used for peregrines, can be covered with ½-inch-pile Astroturf™, cocomat, or indoor/outdoor carpeting.

As for all animals in rehabilitation, adequate drinking water must be provided. Provide drinking/bathing water in unlimited activity flight enclosures or even in all cages if appropriate for the bird's medical condition (e.g., a bird with foot wraps or a wing-wrap should not have a bathing/water pan in any cage). Birds without access to drinking water should receive additional water injected into their food. Drinking water, when available, should be easily accessible to minimize disturbance. Pools must be a minimum of 2-6 inches deep and wider than the length of the raptor.

Table 5: Minimum Housing Guidelines for Raptors

Note: This table is not intended to be used independently; it should be used only in conjunction with the information in Chapter 4, Sections 4.1 and 4.4

Species*	**Restricted Activity** (WxLxH)	**Limited Activity** (WxLxH)	**Unlimited Activity** (WxLxH)
BOOW, BUOW, EASO, ELOW, FEPO, FLOW, NOPO, NSWO, PRSO, WESO, WHSO	12" x 17" x 16"	3' x 6' x 8'	8' x 8' x 8'
AMKE, APFA, EUKE, GRHA, HBKI, MERL, MIKI, **NOHO, NHOW, ROHA, SNKI, SSHA, STHA, WTKI	16" x 23" x 19"	6' x 6' x 8'	8' x 16' x 8'
BNOW, BWHA, COHA, HWHA, LEOW, RSHA, SEOW	16" x 27" x 22"	6' x 8' x 8'	10' x 30' x 12'
BDOW, CBCA, CRCA, GHOW, HRLH, HRSH, NOGO, NOHA, RLHA, RTHA, SPOW, STKI, SWHA, WTHA, ZTHA	16" x 27" x 22"	6' x 8' x 8'	10' x 50' x 12'
BAEA, BLVU, FEHA, GGOW, GOEA, GYFA, OSPR, PEFA, PRFA, **SEEA, SNOW, TUVU **WTEA	3' x 3' x 3'	8' x 10' x 8'	20' x 100' x 16'

(WxLxH) = Listed in order: Width x Length x Height

*Most species are listed using the four letter AOU code (American Ornithologists' Union) defined on page 39

**Indicates that the codes used for these species are not official AOU codes

Codes for Table 5, Raptors

Accipiters
COHA - Cooper's Hawk
NOGO - Northern Goshawk
SSHA - Sharp-shinned hawk

Medium Buteos
BWHA - Broad-winged Hawk
GRHA - Gray Hawk
ROHA - Roadside Hawk
STHA - Short-tailed Hawk

Large Buteos
CBHA - Common Black Hawk
FEHA - Ferruginous Hawk
HRLH - Harlan's Hawk
HRSH - Harris' Hawk
HWHA - Hawaiian Hawk
RSHA - Red-shouldered Hawk
RTHA - Red-tailed Hawk
RLHA - Rough-legged Hawk
SWHA - Swainson's Hawk
WTHA - White-tailed Hawk
ZTHA - Zone-tailed Hawk

Eagles
BAEA - Bald Eagle
GOEA - Golden Eagle
***WTEA - White-tailed Eagle*
***SSEA - Steller's Sea Eagle*

Small Falcons
AMKE - American Kestrel
EUKE - Eurasian Kestrel
***NOHO - Northern Hobby*
MERL - Merlin

Medium Falcons
APFA - Aplomado Falcon
PEFA - Peregrine Falcon
PRFA - Prairie Falcon

Large Falcons
CRCA - Crested Caracara
GYFA - Gyrfalcon

Harriers
NOHA - Northern Harrier

Kites
HBKI - Hook-billed Kite
MIKI - Mississippi Kite
SNKI - Snail Kite
STKI - Swallow-tailed Kite
WTKI - White-tailed/Black-shouldered Kite

Osprey
OSPR - Osprey

Vultures
BLVU - Black Vulture
TUVU - Turkey Vulture

Small Owls
BOOW - Boreal Owl
BUOW - Burrowing Owl
EASO - Eastern Screech Owl
ELOW - Elf Owl
FEPO - Ferruginous Pygmy Owl
FLOW - Flammulated Owl
NOPO - Northern Pygmy Owl
NSWO - Northern Saw-whet Owl
PRSO - Puerto Rican Screech Owl
WESO - Western Screech Owl
WHSO - Whiskered Screech Owl

Medium Owls
BNOW - Barn Owl
LEOW - Long-eared Owl
NHOW - Northern Hawk Owl
SEOW - Short-eared Owl

Large Owls
BDOW - Barred Owl
GGOW - Great Gray Owl
GHOW - Great Horned owl
SNOW - Snowy Owl
SPOW - Spotted Owl

Chapter 5 - MAMMAL HOUSING REQUIREMENTS

5.1 Overview

General guides for mammal housing are difficult to define due to the variation in size, temperament, and life history in mammals. Obviously, a “one-size- or style-fits-all” approach fails when you are housing mammals from bats to bears. Some principles do apply to all mammal housing, however. For example, double door or similar construction is effective in preventing escapes. Wooden cage framing material should be placed on the outside of the enclosure with suitable wall material such as wire, wood, or netting on the inside surface. Visual barriers between cages and between humans and cages provide stress relief to all animal patients. Pre-release cages should be isolated and placed in an area similar to release habitat, if possible.

Most small mammals under four weeks of age can be housed in incubators or aquaria. Screen lids with a heavy object placed on top prevent escapes. Heating pads or hot water bottles, suitably insulated, should be used to provide heat. A source of humidity and cloth or other suitable materials for nesting areas should be provided. A rolled sock or toy stuffed animal of appropriate size, with all movable parts removed, can provide security for infants, especially single animals. Juveniles of the same species can usually be housed together if they are no more than one week apart in age, with appropriate increases in housing size.

5.2 Special Considerations for Selected Mammals

Since most small mammal young can be housed in the same general manner described above, this section addresses the special housing needs for juvenile and adult mammals (except where noted otherwise). Please refer to Table 6 for specifics regarding cage size.

The order in which the groups of mammals appear below and in Table 6 is based on the standard scientific “evolutionary order” as presented in *A Field Guide to the Mammals of America North of Mexico* (see Appendix B, Burt/Grossenheider).

Marsupialia (Opossums):
Hammocks made of one-inch square wire mesh or from burlap sacks, attached to wall or roof (and removable for cleaning); tree limbs and logs at various heights to promote climbing. Plastic barrels for hiding or other things to hide in (logs, boxes, etc.). Large (ferret-sized) exercise wheels may be used to keep young opossums active.

Chiroptera (Bats):
For bats under rehabilitation, many different considerations are important to proper enclosure construction. Security is of top concern regardless of cage size. For example, most bats can easily escape through a 1/2" x 1" crack. Two different types of caging are necessary to accommodate the differences in the roosting behavior of crevice-dwelling and foliage-roosting bats. Crevice-dwelling bats (free-tailed bats, pallid bats, big browns, Myotis bats, evening bats, big-eared bats and pipistrelles) roost in rock crevices, hollow trees, under bridges, beneath bark and in caves and buildings. Foliage-roosting bats (red bats, Seminole bats, yellow bats and hoary bats) roost in the open in trees and other vegetation.

Appropriate temperatures for adult bats receiving rehabilitation and infant bats being hand-raised are very important considerations. These temperatures are generally between 90°F - 100°F. A heating pad, set to low, can be attached to one side of the cage to create a temperature gradient. Do not place heating pads on the floor of the container. A bird brooder or a 25-watt red light bulb may be used instead of a heating pad. Place the brooder or light at the top of the cage on the outside. Incubators are inappropriate for bats, as a temperature gradient is needed rather than a constant temperature. Humidity should be provided by use of a humidifier or by keeping a small, damp sponge inside the cage. Padding should be placed on the floor of the cage to protect injured adults and/or infant bats. Soft fabric allows the bat(s) to climb and hide. Terrycloth is inappropriate due to risk of entanglement.

Caging for crevice-dwelling bats (restricted/limited activity):

All walls and floor of an aquarium or plastic cage should be lined with a soft, snag-resistant fabric such as t-shirt or flannel material. Environmental enrichment can include items made from fabric such as roosting pouches, or ramps and bridges made from plastic mesh craft sheets.

Caging for foliage-roosting bats (restricted/limited activity):

Foliage-roosting bats should be housed in a frame cage. The cage should be covered with soft, lightweight 1/6" plastic mesh to avoid toe and foot injuries. Environmental enrichment should be provided by securely attaching small branches with silk leaves against the ceiling of the cage.

Unlimited activity/mobility flight cages:

Outdoor flight cages should be double enclosed or have a double entry system similar to aviaries. An 8'x8'x10' screened tent with an extra door flap works well for outdoor housing if the area is secure from predators. If a double enclosure is used, the inside cage should be constructed of a frame covered with soft, lightweight 1/6" plastic mesh, netting or nylon screening. One side can be covered with 1/4" plastic mesh to allow insects to enter the enclosure. The outside of the enclosure should be covered with sturdy 1/4"-1/2" metal screening (hardware cloth or hail wire) to protect from predators.

Roosting pouches or boxes should be placed inside flight cages along the ceiling for crevice-dwelling bats. Small branches with silk leaves should be secured along the ceiling for foliage-roosting bats. Hanging plants also work well for shelter and resting areas. A tarp should be placed over a section of the cage to shade the roosting area and to provide shelter against inclement weather.

Water dishes should be small and can be made from baby food jar lids that are placed on the cage floor or film canisters that are cut to one inch high and hung on cage walls (Velcro™ works well to attach these canisters). Small cups can be hung from the sides of the cage for foliage roosting bats; however, marbles or small stones should be placed inside the cup to prevent the bat from falling in and drowning. Food dishes should be placed against cage walls and should be shallow enough to allow bats that self-feed to easily climb in and out, but deep enough to prevent mealworms from escaping. For certain species, such as western pallid bats, food and water should be provided on the ground. Internal light sources used to attract insects should have covered bulbs (plastic, not metal) to prevent bats from having contact with hot light fixtures.

Environmental enrichment should be included in all caging to provide mental stimulation. Items that are placed into cages to provide diversity should be free of sharp surfaces, easily cleaned and appropriate for the species.

Transport cages for bats:

Transport carriers should be ventilated, well padded and covered so they protect and provide a sense of security for the bat inside. They should also be constructed so that they can be secured inside a vehicle with a seat belt. For example, a screen window can be sewn or glued into a cloth compact-disk carrier (with the plastic insert removed). A seat belt can then be slipped through the handle to secure the carrier during transport.

Ursids (Bears):
Den should be made of solid wood, concrete blocks or bricks, 8'x8'x6'. This will house one adult or two juveniles. Flooring substrate should be natural (dirt and grass) in order to avoid damage to the foot pads. Heavy logs and a large indestructible tub for bathing are also necessary.

Procyonids (Raccoons):
Special cage furnishings for this group include hammocks made of one-inch square wire mesh or from burlap sacks, attached to walls or the roof that are removable for cleaning, and plastic barrels or other things in which to hide (e.g., logs). Additionally, tree limbs and logs at various heights to promote climbing should be in enclosures. A wading pool or container applicable to the animal's size should be provided to allow bathing and food handling. Outdoor enclosures should allow 30 square feet per animal when raccoons are group housed. An enclosure which is 12'x18' (216 square feet) could house seven raccoons, and an enclosure which is 40'x20' (800 square feet) could house 26 raccoons. Cages used for raccoons should not be used for other species due to possible parasitic infection.

Mustelids (Badgers, Weasels, Skunks, etc.):
This group contains ambitious diggers. The bottom of the cage must be secured so that the animal cannot dig out. A metal garbage can turned on its side and lined with tree trimmings or shavings can be used as a den. A large wooden box with at least a three-foot depth of pesticide-free soil should be provided for digging.

Felids (Cats):
Large branches and logs (some hollow) should be provided for climbing, along with high platforms for resting above the cage floor. Other furnishings are plastic barrels or other things to hide in (logs, boxes, etc.).

Marine Mammals:
Shall be housed in accordance with Animal and Plant Health Inspection Service (APHIS) Standards. (see Appendix B)

Rodentia (Mice, Rats, Squirrels, etc.):
Generalizations are difficult to make for such a large and diverse group, so refer to the natural history of the species undergoing rehabilitation for a better understanding of appropriate habitat requirements. Placing a heavy object on top of the lid of indoor caging prevents escapes. Paper towel rolls can be used as hiding places. Many small rodents require sand for burrowing and some species may utilize dirt for burying food, dust baths, or other

behavioral activities. Burrowing can be a very important behavior in this group. Plant material and soil are important habitat requirements for many small mammals.

Outdoor caging should be made of material such as hardware cloth to prevent escape. Dirt or sand floors should have hardware cloth or plywood buried along the interior sides of the cage, approximately 12" below the surface to prevent escape. Roofing may be constructed of hardware cloth stapled to wood slats using heavy staples. Branches for gnawing should be included for juveniles five weeks of age and older. Gnawing curbs tooth growth and is essential; bark on any branches or logs must be edible. Tree squirrels and other climbers require vertical height more than horizontal space. Branches, nestboxes, and/or platforms should be provided for climbing enhancements.

Semi-aquatic Mammals (Muskrats, River Otters, Nutria, Beavers):
This group has obvious special needs. Animals must have water containers that are large enough to swim in and are at least two feet deep. Examples include bathtubs, metal troughs, metal or concrete pools (plastic kiddie pools are not deep enough and will be destroyed by the animal). Deep, heavy rubber pans work well for water containers in inside housing. Containers of soil at least one foot deep should be provided for digging, with plastic barrels or other things to hide in (logs, boxes, etc.) that are attached to the wall of the cage.

Lagomorpha (Rabbits, Hares, Pikas):
Special construction materials are needed for this group. Avoid using wood in cage construction as these animals will chew through the wood. Avoid using chain link, wire mesh, or hardware cloth as the sole materials in construction of cage walls; these animals do not have good depth perception and will not “see” the fencing. “Sight barriers” at the height of the adult animal’s ears (12"-24") made of shade cloth or mesh screening may be used to line the exterior. Do not place cloth or screening on the interior as animals will chew this material. Indoor housing must also be covered to provide visual barriers as a means of reducing stress. If raised, above-ground enclosures are used, the bottom should be constructed of 1/4-inch mesh for drainage, and covered with hay to prevent foot trauma. No protruding objects should be present along the interior surface of cage walls as these animals will usually run the perimeter of their enclosure.

All enclosures should contain a freestanding shelter, facing away from the entrance. Branches or logs with edible bark for gnawing to curb tooth growth should be readily available. Rabbits will need soft earth or mounds of hay to burrow into. Natural desert shrubs or bales of hay can be used to provide shade and shelter for jackrabbits as they do not burrow. Jackrabbits grow rapidly in size and strength, requiring large caging by six weeks of age, although they do not wean until 8-12 weeks of age.

Artiodactyla (Hoofed Animals):
Outdoor enclosures are most appropriate when constructed of wood; however, if chain link is used for the walls, drapes must be hung over the inside of the chain link to avoid injury to the animal and to keep it from climbing out (i.e., blankets or tarps tied securely). Circular enclosures work well as animals will be encouraged to run along walls rather than run into a corner and injure themselves. General practice is to take deer and pronghorn directly from injured adult caging to release in an effort to prevent cage trauma. Bighorn sheep jump high while pronghorn will jump long distances but not as high.

Table 6: Minimum Housing Guidelines for Selected Mammals

Note: This table is not intended to be used independently; it should be used only in conjunction with the information in Chapter 5, Sections 5.1 and 5.2

Order/ Family	Infant Care (WxLxH)	Nursing/ Pre-weaned (WxLxH)	Juvenile or Adult Outside (WxLxH)	Initial Injured Adult Inside (WxLxH)
Marsupialia				
Opossum	(L) 10GAL.	(L) 3x3x3	(1) 4x4x8	(1) 2x2x2
Insectivora				
Shrews & Moles	10 GAL / 1 adult or 1 litter			
Chiroptera (Bats)	18"x12"x12"	18"x12"x12"		18"x12"x12"
Little Browns & Pipistrelles			6x8x8	
Evening, Red, Myotis			8x12x8	
Big Browns, Free-tails, Hoary, Pallid & Yellow			10x20x8	
Carnivora				
Bears				
Black Bear	(L) 20GAL.	(L) 3x6x3	(L) 20x36x16*	(1) 8x12x8
Raccoons, Coatis & Ringtails	(L) 10-20GAL.	(3) 3x3x3	(4) 6x8x6*	(1) 2x3x3
Mustelids				
Marten	(L) 10GAL.	(1) 3x3x3	(1) 4x8X6	(1) 2x2x2
Fisher	(L) 10GAL.	(1) 3x3x3	(1) 6x8x6	(1) 4x3x3
Weasel	(1) 10GAL.	(1) 10GAL.	(1) 3x3x3	(1) 3x3x3
River Otter	(L) 20GAL.	(L) 6x12x6	(1) 6x12x6*	(1) 6x12x6*
Sea Otter	(L) 20GAL.	(L) 6x12x6	(1) 6x10x6	(1) 6x8x6
Wolverine	(1) 10GAL.	(1) 3x3x3	(1) 8x12x6	(1) 4x3x3
Badger	(L) 20GAL.	(L) 3x3x3	(1) 8x8x6*	(1) 3x3x3
Skunk	(L) 20GAL.	(L) 2x4x3	(1) 6x8x6	(1) 3x3x3
Canids				
Coyote	(L) 30GAL.	(1) 3x3x3	(1) 8x8x6	(1) 3x3x3
Wolf	(L) 30GAL.	(1) 3x3x3	(1) 8x8x6	(1) 4x3x3
Fox	(L) 30GAL.	(L) 3x3x3	(1) 4x4x8	(1) 3x3x3
Felids				
Mountain Lion	(L) 10GAL.	(L) 3x6x3	(L) 6x24x8*	(1) 4x3x3
Bobcat	(L) 10GAL.	(2) 3x3x3	(1) 8x8x6*	(1) 3x3x3
Rodentia				
Aplodontia	(L) 10GAL.	(1) 3x3x3	(1) 8x8x6	(2) 2x2x2

Order/ Family	Infant Care (WxLxH)	Nursing/ Pre-weaned (WxLxH)	Juvenile or Adult Outside (WxLxH)	Initial Injured Adult Inside (WxLxH)
Rodentia (cont'd.)				
Squirrels				
Woodchuck & Marmots	(L) 20GAL.	(L) 2x4x3	(1) 6x8x6	(1) 3x3x3
Prairie Dogs	(L) 20GAL.	(L) 2x4x3	(1) 6x8x6	(1) 3x3x3
Ground Squirrel & Rock Squirrel	(L) 10GAL.	(L) 4x6x2	(1) 4x6x6	(1) 2x2x2
Mojave Ground Sq.	(L) 15GAL.	(L) 15GAL.	(L) 2x2x2	(1) 2x2x2
Golden-mantled Sq. & Chipmunk	(L) 10GAL.	(L) 10GAL.	(L) 2x2x2	(1) 2x2x2
Tree Squirrel	(L) 10-20GAL.	(L) 20GAL.	(L) 4x4x8	(1) 4x6x4
Pocket Gophers	(L) 15GAL.	(L) 15GAL.	(L) 15GAL.	(1) 15GAL.
Kangaroo Rats & Mice & Pocket Mice	(L) 15GAL.	(1) 15GAL.	(L) 4x6x2	(1) 4x6x2
Beaver	(L) 10GAL.	(1) 3x3x3	(L) 8x12x6	(1) 4x3x3
Mice, Rats, Voles				
Mice	10 GAL / 1 adult or 1 litter			
Wood Rat	(L) 15GAL.	(L) 15GAL.	(1) 4x6x2	(1) 4x6x2
Muskrat	(L) 15GAL.	(L) 20GAL.	(2) 4x6x2*	(1) 4x6x2
Porcupine	(L) 15GAL.	(L) 3x3x3	(1) 6x8x6	(1) 3x3x3
Nutria	(L) 20GAL.	(L) 2x4x3	(1) 6x8x6	(1) 3x3x3
Lagomorpha				
Jackrabbit	(1) 10GAL.		(1) 20x20X8	(1) 18"x36"x12"
(2-6wks)		18"x18"x12"		
(6-12wks)		10'x10'x4'		
Cottontail Rabbit	(1) 10GAL.	(1) 10GAL.	(1) 6x6x4	(1) 12"x18"x12"
Artiodactyla				
Wild Pig	(L) 2x2x2	(L) 10x15x8	(L) 10x15x8	(1) 6x8x8
Elk	(1-2) 6x6x2	(4) 12x20x6	(6) 30x50x6 (+)	(1) 8x8x8
Deer	(1-2) 4x4x2	(4) 10x15x6	(6) 30x50x6 (+)	(1) 8x8x8
Pronghorn	(1-2) 4x4x2	(4) 10x15x6	(+)	(1) 8x8x8
Bighorn Sheep	(1-2) 4x4x2	(4) 10x15x6	(6) 30x50x6 (+)	(1) 8x8x8
Xenarthra				
Armadillo	(L) 15GAL.	(L) 3x3x3	(1) 6x8x4	(1) 3x3x3

(WxLxH) = Listed in order: Width x Length x Height, in feet (unless otherwise indicated)
* = See specific species requirements
(+) = See specific species requirements for hoofed stock
GAL. = Gallons (e.g., aquarium or hard plastic pet kennels)
(#) = Number of animals
(L) = Litter - Note: occasional large litters (8-10 animals) may require larger housing

Chapter 6 - REPTILE HOUSING REQUIREMENTS

6.1 General Reptile Housing Considerations

These guidelines have been developed by zookeepers and breeders as minimums to keep an animal healthy and reasonably content in captive surroundings and are suitable for animals undergoing rehabilitation.

The cage sizes listed in Table 7 are minimum sizes that are acceptable for most circumstances. Some animals may have special keeping requirements that these recommendations will not cover adequately. Learning the habits of a particular species and applying that knowledge to the housing, both in terms of size and substrate, is essential for proper care. For example, a snake species that ambushes prey would require less space than one that pursues prey. In addition, a four-foot iguana can be suitably housed in a six-foot high cage, not the 8-12 feet suggested in the table. The minimum standard is to provide adequate space for the animal to move and hunt (if necessary), and to provide an appropriate area to hide and/or bask, depending on the needs of that species.

Fresh water needs to be regularly available. Water dishes should be kept clean and disinfected. Some animals require misting to drink - they will not drink from standing water.

The animals should be kept in environmental conditions (heat and humidity) similar to the ones in which they are found. If air conditioning is used to keep temperatures down during hot summers, cages may require misting or other measures to raise the humidity to a level similar to that found outdoors. If forced-air heat is used in the winter, similar measures will be necessary to provide adequate humidity. Checking humidity once per day prevents possible problems. The natural history of each species will help to determine their preferences for microhabitat, thereby influencing housing practices.

6.2 Construction Materials

Aquaria/terraria work well for housing most reptile species, depending on the size of the animal. Security of the caging, in order to prevent injury to the animal or to other animals in the facility, is a minimal requirement. The cage must be free of rough surfaces on the interior walls and roof, and must be furnished appropriately for the species.

6.2.1 Substrates

Selection of an appropriate substrate is extremely important to the long-term health of any reptile. Some reptiles must be able to burrow successfully in their substrate.

Aspen - recommended. The shredded type is absorbent and nonabrasive. It also lacks the volatiles that make so many tree-chip products unsuitable.

Astroturf™ - acceptable for snakes. Several pieces, cut to fit the enclosure should be kept at all times. Since it is not absorbent, it should be changed when soiled. Lizards and turtles may catch and tear their claws in the fabric.

Carefresh™ - while not aesthetic, it is absorbent, allows tunneling, and does not swell up with the addition of liquids, making it reasonably safe to ingest. Terrestrial snakes do well on it.

Cedar - **not** recommended. It contains volatile oils that will kill many invertebrates and cause respiratory problems (if not worse) with most reptiles.

Clay - often used for "kitty litter", it should **never** be used as a substrate. It is extremely dehydrating and can cause respiratory problems, skin problems, and prevent snakes from shedding properly.

Corncob - **not** recommended. It is easily ingested and may cause intestinal impaction.

Gravel - **small gravel should not** be used. It is easily ingested by reptiles and may cause serious impactions. Large gravel is safer, but should be smooth, such as the quartz types. It can be washed, disinfected with bleach, rinsed well, sun-dried and reused.

Kitty Litter - see Clay

Mulch - may be used to hold moisture if the bark is not made from cedar. Fir is relatively low in volatiles. Check the bark before buying - if it smells 'piney' it contains potentially harmful volatiles.

Newspaper - recommended. Safe, hygienic, easy to clean, absorbent.

Paper Toweling - recommended. Safe, hygienic, easy to clean, absorbent.

Peat - **not recommended**, as it is dusty, dries easily and may irritate reptile mucosa; can also cause respiratory ailments.

Pine - **chips not generally recommended**, due to volatile chemicals present in the wood. Bark mulch may be used if required to hold moisture and it is not 'piney' smelling.

Sand - should be **limited** to those animals that habitually live in sand dunes or as a floor for aquarium dwellers such as soft-shelled turtles. Generally, sand is abrasive, and may be ingested, causing impactions.

Soil - should be sterilized before use.

Sphagnum Moss - can be used for specific applications with certain fossorial or burrowing animals. The material should be turned several times per week, unless it is placed over a gravel bed, to spread moisture that gathers underneath the moss. Replace completely every three months.

6.3 Furnishing

If an animal must be kept for a lengthy period, cage accessories may contribute to the animal's mental health. The most useful additions to most cages are a branch for climbing and a basking rock. Some snakes, such as the green snakes, are primarily arboreal and require a branch to feel secure.

All reptiles must be allowed to hide and bask as needed. Placing a suitably sized hide box at either end of their cage is usually adequate to support their need for a sense of safety. For snakes, the hide must be large enough for the snake to coil up inside. A basking spot may be provided by placing a flat rock under the basking light - the rock will absorb heat during the day and allow the snake a preferred area to digest or warm itself. Supplemental under-tank heating is a good idea if the animal is from the southern United States or a similar hot area.

Table 7: Minimum Housing Guidelines for Reptiles

Note: This table is not intended to be used independently; it should be used only in conjunction with the information in Chapter 6, Sections 6.1 through 6.3

Type	Length	Width	Height
Snakes			
Burrowing	3/4 animal's length	1/3 animal's length	1/2 animal's length, add 6" to 12" for substrate
Terrestrial and Semi-Aquatic	3/4 animal's length	1/3 animal's length	1/2 animal's length, not less than 12"
Arboreal types	3/4 animal's length	1/3 animal's length	animal's length, not less than 12"
Lizards			
Burrowing	3 x animal's length	1/3 animal's length	1/2 animal's length add 6" to 12" for substrate
Terrestrial	3 x animal's length	2 x animal's length	animal's length with cover, or high enough to prevent escape
Semi-Aquatic	3 x animal's length	2 x animal's length	animal's length with cover, or high enough to prevent escape, plus 12" - 24" for water depth
Arboreal types	3 x animal's length	2 x animal's length	2 - 3 x animal's length with cover
Crocodilians	5 x animal's length	2 x animal's length	high enough to prevent escape
Turtles			
Terrestrial	5 x animal's length	5 x animal's length	high enough to prevent escape
Aquatic and Semi-Aquatic	5 x animal's length	3 x animal's length	high enough to prevent escape, plus water to a depth 3 x animal's width

Chapter 7 - FINAL DISPOSITION

7.1 Overview

Once an animal comes into rehabilitation, it is faced with one of four fates; death from its injuries, permanent confinement as an education or placed animal due to factors preventing release, successful rehabilitation and release, or euthanasia. This chapter addresses the last two outcomes - release and euthanasia. Both are complex tasks for the rehabilitator. Successful release of a rehabilitated animal is predicated on an understanding of biological and non-biological factors. These include medical and physical readiness of the animal, life stage, release strategy, and release habitat.

Euthanasia is the hardest task a rehabilitator has to perform. Animals should not be considered for release that have vision impaired in both eyes, have amputated wings or legs, are imprinted, have a high likelihood of infecting wild animals with disease, or are rabies vector species from an area in which rabies is endemic (unless dictated otherwise by a local RVS rehabilitation program). Other reasons exist that animals should not be released, as well. These animals may find freedom through euthanasia.

7.2 Minimum Standards for Release of Wildlife Following Rehabilitation

Establishing and following set guidelines for release condition will aid in initial decisions for treatment, husbandry care protocols, and evaluation of readiness for release. For all wild animals undergoing rehabilitation, the following criteria must be met prior to release.

A brief physical exam should be performed to ensure that the patient is healthy and ready for release. In general, candidates for release must:

- Exhibit full recovery from the original injury or from injuries incurred while in care.
- Be no longer in need of medical care.
- Exhibit no signs of active disease.
- Have normal laboratory values, if tested (PCV, TS, BUN, etc.).
- Possess pelage or plumage that is adequate for that species to survive.
- Possess adequate vision to find/catch food and maneuver in a normal manner.
- Exhibit locomotive skills necessary for that species to survive.
- Demonstrate the fight or flight behavioral response.
- Demonstrate proper foraging behavior (self-feeding if raised in captivity).
- Demonstrate proper species behavior (not improperly imprinted).
- Be of correct age for independent survival.
- Be of correct weight for that sex, species, age and season.
- Exhibit waterproof pelage/plumage sufficient for that species.

In addition to the above parameters for the condition of the animal, many other considerations must be made. Suitable habitat with an adequate food supply, appropriate weather, season, and time of day are necessary for a successful release. Releases must occur within the parameters of local, state, and federal regulations or laws. The proximity of busy roadways, the presence of natural or introduced predators (e.g., domestic cats), human developments, existing populations of that species, and long term food sources should always be factored into determining the suitability of a release site.

7.3 Acceptable Euthanasia Methods

Definition

Euthanasia is defined as the induction of death with minimal pain, stress or anxiety. Wildlife rehabilitators who direct the operation of a facility must make these decisions, as well as supervise the euthanasia procedures. They must also exhibit understanding and compassion for those who have been involved with the terminal case.

Criteria

While no ideal euthanasia agent exists, the procedure of choice should approach as closely as possible the following criteria:

- Produces rapid loss of consciousness and death
- Exhibits consistent and predictable action
- Is easily and safely administered by properly trained personnel
- Causes minimal psychological stress to the animal
- Causes minimal emotional effects to observers and participants
- Is not subject to abuse by humans
- Interrupts consciousness and reflexes simultaneously
- Is not a sanitation or environmental problem
- Results in no tissue changes that would affect a postmortem diagnosis
- Is economical and readily available

The method of euthanasia is only as humane as the knowledge and skill of the operator performing it. The safety of the operator shall be given as much consideration as humaneness of the method.

7.3.1 Acceptable Euthanasia Methods

Below is a brief description of some methods of euthanasia recommended for use in wildlife. None of these methods should be used without proper training and, in the case of some of the regulated substances, without proper licensing. The *1993 Report of the AVMA Panel on Euthanasia* provides additional information on methods of euthanasia for wildlife. Please note: The IWRC and the NWRA do not condone all of the methods in the *2000 Report of the AVMA Panel on Euthanasia* as being appropriate for use in wildlife. Each wildlife rehabilitator is urged to seek and learn to use those methods which s/he feels are humane and within their legal and practical limits.

Physical Methods:

Cervical luxation/dislocation:
Causes death by severing the spinal cord and destroying ascending sensory (pain) pathways, resulting in depression of central nervous system (CNS), respiratory and cardiac functions. Grasping the body of the animal and the base of the skull, the neck of the animal is hyper-extended. The neck is rotated in a down-and-away motion relative to the body position using the thumb and forefingers, separating the first cervical vertebra from the base of the skull and severing the spinal cord.
Advantages: Clean; safe to perform; moderately rapid; special equipment not required.
Disadvantages: Must be performed by skilled personnel. May be aesthetically objectionable to staff/volunteers/public. Should only be performed on small birds and mammals; animal may remain conscious for a brief period following dislocation (may convulse prior to death).

Decapitation:
Causes death by severing the spinal cord and destroying ascending sensory (pain) pathways, resulting in depression of CNS, respiratory and cardiac functions.
Advantages: Moderately rapid; effective in reptiles, though movement may continue following decapitation; therefore, the brain of reptiles must also be pithed or otherwise destroyed to ensure that there is no residual brain activity.
Disadvantages: Must be performed by skilled personnel. May be aesthetically objectionable to staff/volunteers/public. Should only be performed on small animals; animal may remain conscious for a brief period following decapitation (may convulse prior to death).

Exsanguination:
Laceration of a major vessel (usually the jugular vein) results in rapid blood loss and decrease in blood pressure.
Advantages: Moderately rapid death; better if done on sedated, stunned or anesthetized animals.
Disadvantages: May cause anxiety and pain in a conscious animal; requires skill and training; may be aesthetically unappealing.

Gunshot
Causes immediate unconsciousness by direct and rapid destruction of brain tissue when positioned properly.
Advantages: Rapid; can be used on most species.
Disadvantages: Must be performed by skilled personnel. Requires special equipment and may require firearm permit. May be aesthetically objectionable to staff/volunteers/public. Potential for human injury. Cannot be used for animals suspect of rabies unless a portion of the brain is left intact for lab testing, and care should be taken if using in rabies vector species to avoid accidental exposure to rabies-infected brain tissues via aerosolized particles.

Penetrating captive bolt:
Causes immediate unconsciousness by direct and rapid destruction of brain tissue when positioned properly. Bolt is positioned properly against the skull and fired. This is one of the few options for euthanizing large ruminants or carnivores; has also been used on small ruminants.

Advantages: Rapid.
Disadvantages: Must be performed by skilled personnel. Requires special equipment and may require permit. May be aesthetically objectionable to staff/volunteers/public. Must be done at close range (nearly direct contact to the animal's skull) and the animal must be properly restrained or sedated to insure accuracy.

Adjunct Physical Methods (should not be used as sole method):

Pithing:
Causes direct destruction of brain and spinal cord as a needle or probe is inserted into the base of the skull.
Advantages: Rapid; one of the few methods effective in many reptiles.
Disadvantages: Must be done on an unconscious animal; requires skill and training; may be aesthetically unappealing.

Stunning (blunt force trauma):
Striking of the skull, resulting in unconsciousness of the animal.
Advantages: Rapid unconsciousness.
Disadvantages: Not a sole method of euthanasia - usually followed by exsanguination; requires skill to be done properly; may be aesthetically unappealing; should not be used if the brain must be examined (as with suspect rabies cases).

Inhalation Agents:

Care should be taken when using chambers to contain animals for euthanasia because overcrowding or mixing of species can cause severe apprehension and psychological stress prior to death.

Halothane, isoflurane, enflurane, sevoflurane and methoxyflurane:
Cause direct depression of CNS; should be done in a chamber in a well-ventilated area to reduce human exposure.
Advantages: Useful when venipuncture is difficult as with small animals such as birds, bats, rodents, and small carnivores; some of these agents are nonflammable and nonexplosive under ordinary conditions; generally aesthetic; causes very little change that interferes with necropsy results.
Disadvantages: Some agents can be injurious to personnel and must be used in well-ventilated areas or with gas-scavenging devices; very young, old and/or respiratory impaired animals may be resistant to the effects and struggle for a period of time; diving birds and mammals may require a considerable length of time to reach respiratory arrest.

Carbon dioxide (CO_2):
Useful for small animals in chambers. The animal is placed into the chamber prior to the addition of the carbon dioxide; once the animal is in the chamber, CO_2 is added to the chamber, sinks to the bottom and displaces the ambient air. Death is caused by direct depression of CNS, respiratory and cardiac functions. Concentrated CO_2 gas is noxious and irritating, and can cause a conscious animal to become distressed if placed into a chamber already filled with CO_2. Dilute CO_2 (mixed with oxygen) is not recommended either, as this mixture has been shown to actually prolong the time of death as the ambient air is displaced at a much

slower rate. If dry ice is used as a source of carbon dioxide, it should not come in contact with the animal.
Advantages: It is easily available in compressed cylinders or as “dry ice”; it is inexpensive and safe.
Disadvantages: Because it is heavier than air, incomplete filling of the chamber can permit a climbing animal to avoid a lethal dose. This method should not be used for animals with severely depressed respiratory rates (e.g., animals in hibernation). May not be effective with bats and newborn animals, as they have a very high tolerance for carbon dioxide. Beaver and other diving mammals and birds may hold their breath for extended periods of time therefore requiring longer time for the carbon dioxide to take effect.

Carbon monoxide:
Useful for small animals in chambers. Causes death by irreversibly binding with hemoglobin in the red blood cells.
Advantages: It is easily available in compressed cylinders; is rapid.
Disadvantages: Very hazardous to human health; this odorless, tasteless gas may be lethal in humans at as little as 0.4% concentration.

Ether and Chloroform:
Cause direct depression of CNS. Usually administered in a closed chamber within a well-ventilated room.
Advantages: Moderately rapid; inexpensive; most effective when used on small animals.
Disadvantages: Ether is explosive and can be irritating to the animal; chloroform is a known liver toxin and carcinogen; potential human health hazard if used in poorly ventilated area.

Adjunct Inhalant Agents (should not be used as sole method):

Nitrous oxide:
Nitrous oxide alone is inadequate, but when used as a carrier gas, it speeds up the uptake of other volatile gases (halothane, isoflurane, enflurane, and methoxyflurane).

Non-inhalant pharmacologic agents:

Barbiturates:
(Pentobarbital) Intravenous or intra-cardiac injection results in direct depression of CNS, respiratory and cardiac functions. Intra-abdominal injection may be acceptable in mammals when a vein is not accessible. Intramuscular injection will result in extensive tissue necrosis and pain.
Advantages: Rapid and smooth induction of unconsciousness; usually aesthetically acceptable to staff/volunteers/public.
Disadvantages: Intravenous administration is necessary for best results; requires Drug Enforcement Administration registration, record-keeping, and special storage conditions. These drugs are subject to abuse by humans. They do not cause analgesia, and low doses may actually produce a hyperesthetic effect (i.e., the animal may actually become more sensitive to stimuli).

Preanesthetics:
(Ketamine, Xylazine and others) can be given by intramuscular injection to both mammals and birds to facilitate euthanasia by another method. These drugs should not be used as sole euthanasia agents.

Methods considered inhumane and/or unacceptable for euthanasia of wildlife

Many techniques have been used to provide death to wild animals, but many of these are also considered inhumane (therefore not true euthanasia) or extremely dangerous, and are not condoned under these *Minimum Standards for Wildlife Rehabilitation*. Methods which are not approved for use in wildlife are:

- Acetone
- Air embolism
- Cyanide
- Drowning
- Electrocution
- Freezing
- Kill traps
- Neuromuscular blocking agents used alone (succinylcholine, potassium chloride, magnesium sulfate); may be acceptable if used in combination with a sedative
- Nitrogen or argon gas
- Nitrous oxide used alone
- Strychnine
- Thoracic compression

7.3.2 Disposal of Carcasses and Animal Waste Products

Proper methods for disposal of animal carcasses and waste products should be followed as described in section 2.3.5.

Appendix A - Form 1: Facility Review

INTRODUCTION

The information and questions contained in this form are a means for rehabilitation facilities and individual rehabilitators to do a self-evaluation or self-review. The purpose is to provide wildlife care-givers suggestions to save time (for example, keeping reference materials at the phone), to ensure wildlife receives appropriate housing and medical treatment (exam area, caging, veterinary and diagnostic), and to protect both wildlife and humans from disease and contamination (food preparation, disinfecting, housekeeping). Not all items contained in the form will apply to everyone - an individual rehabilitator probably does not require a grievance committee or Worker's Compensation Insurance - but this form does provide an easy reference to be sure important considerations are not overlooked when changes, such as facility growth, do occur.

Facility Review

I. RECEIVING AREA

A. Public Information

1. Are there written policies or procedures for staff and volunteers dealing with wildlife problems?
2. Does the organization have information available to the public on the services it provides for wildlife?

B. Procedures: Does the organization have operational policies available to staff members and volunteers (e.g., operations manual, rules derived from Board decisions, or training materials)?

C. Records

1. Is there a medical record for each animal that has a medical problem?
2. Do animals without medical problems have records (e.g., orphans)?
3. Are the records legible?
4. Are records adequately completed (i.e., can the progress of the animal be followed by reviewing the record)?
5. Is there a system to identify each animal to its record?

D. Facilities

1. Is the reception area neat and presentable?
2. Is it organized so that resident patients are not subject to stress during the intake of new animals?

E. Telephone Services: For those providing help, assistance ,and directions to the public, are protocols established to provide assistance in the following areas:

1. Humanely preventing or reducing wildlife problems, conflict situations, and injury?
2. Determining if animals in fact need to be rescued?
3. Providing strategies and techniques to give opportunities for mother animals to retrieve temporarily displaced young or to re-nest?
4. Suggesting safe capture, restraint and transport techniques to minimize risk of injury to animals and to humans?

II. INTAKE/EXAM AREA

A. Is the area clean?

B. Is the area set up so that animals can be examined safely?

C. Are first-aid supplies available?

D. Are there scales available to weigh animals as part of intake and assessment?

E. Are animals awaiting exam/treatment provided a warm, quiet and dark place?

F. Are facilities arranged and/or constructed to minimize stress on the animals?

G. Are the sound and activity levels minimized to reduce stress on the animal?

H. Are capture and handling equipment easily accessible and in good working order? Are they used safely?

I. Are capture, handling, and restraint procedures safe for animals and humans?

J. Are the people handling wildlife trained in safe handling techniques?

III. FACILITIES FOR INTENSIVE NURSING CARE

☐ Available at a veterinary facility ☐ Available on-site

A. Are the following available for use when necessary?

☐ Incubators ☐ Heat sources (lamps, pads)

B. Is the area clean?

C. Is it a low-use area?

IV. SURGERY

☐ Available at veterinary clinic/hospital ☐ Available on-site

A. Is the area aseptic?

B. Is there resuscitative equipment available?

C. Is there a pre-surgical prep area?

D. Is the surgical equipment in good working order?

E. Is an anesthetic maintained?

V. RADIOLOGY SERVICES

☐ Available at veterinary clinic/hospital ☐ Available on-site

Vl. INITIAL CARE FACILITIES

A. Do the cages meet caging standards for the species handled?

B. Are they constructed so that they can be cleaned and disinfected (e.g., stainless steel, fiberglass, sealed wood, coated port-a-pets)?

C. Are the cages cleaned regularly (as appropriate for the species and cage type)?

D. Is the area adequately ventilated in an appropriate manner?

E. Is there adequate lighting (full-spectrum light at the appropriate hours)?

F. Are isolation facilities available (on-site, at a veterinary clinic, elsewhere)?

G. Is the area away from the main flow of human activity?

H. Is there access to the area by domestic pets?

Vll. PRIMARY EXERCISE CAGING

A. Do they meet caging standards for the species being handled?

B. Are they cleanable?

C. Is there a regular cleaning schedule?

D. Are they safe to the handlers and animals being held (e.g., no loose or sharp wires or nails, double doors, etc.)?

E. Are they secure (e.g., locking, sturdy, safe from predators)?

VIII. PHARMACY

A. Is the area clean and organized?

B. Are needed medications on hand? Are other medications available by prescription or through sponsoring organizations?

C. Are controlled drugs (schedules II, III, IV) kept in locked, secure location?

D. Is there a log for controlled drugs?

E. Are antibiotics, parasiticides, vaccines, etc., available either in the pharmacy or on a prescription basis?

F. Are emergency medications available?

IX. DISINFECTING

A. Is there a standard procedure and schedule for cleaning and disinfecting cages, feeding utensils, syringes, food storage containers, and food, water, and bathing bowls?

B. Are cleaning and disinfecting supplies available and stored properly?

1. Is human protective gear (gloves, masks, goggles) available?

2. Are instructions on the proper use of disinfectants displayed?

C. Is there a designated area for storage, cleaning and disinfecting of dirty items?

D. Is there a designated area for storage of clean and disinfected items?

X. PATHOLOGY SERVICES

☐ Available on-site ☐ Available through veterinarian ☐ Commercial account

Can the following services be provided to wildlife when necessary?

A. Hematology (PCV, Diff., Hb, WBC, Clot Time, ESR, Serum Chemistries)?

B. Parasitology?

C. Microbiology?

D. Necropsy Services?

If done in shelter:

1. Are separate instruments used for tissue gathering and necropsy?

2. Are dead animals disposed of in accordance with applicable ordinances or regulations?

XI. FOOD PREPARATION & STORAGE

A. Is the area clean, orderly?

B. Are adequate foodstuffs and supplies available?

C. Are foodstuffs (chicks, rats, fish) stored separately from dead (rehabilitation) animals?

D. Are perishable foodstuffs dated (open formula)?

XII. HOUSEKEEPING & MAINTENANCE

A. Is there a reasonable schedule for:

1. Daily cleaning?

2. Weekly cleaning?

3. Seasonal cleaning?

B. Is there a continuing program for repair and upkeep of the facility?

XIII. LIBRARY

A. Is there a continuing program for acquisition of pertinent publications on wildlife rehabilitation?

B. Are manuals/books available on providing humane solutions to human/wildlife conflicts?

C. Are publications available which describe each species and its natural history?

XIV. SAFETY

A. Is there a fire alarm?

B. Is there a fire extinguisher(s)?

C. Are eating, drinking, smoking, etc., restricted to designated areas?

D. Is there a first-aid kit available for staff/volunteers?

E. Are material data safety sheets (MSDSs) readily available/easily accessible for those chemicals used at the facility (disinfectants, cleansers, certain drugs, etc.)?

XV. ORGANIZATIONAL STANDARDS

A. Does the individual or organization comply with local ordinances and have current state/provincial/federal permits for the work being done?

B. Is there a grievance policy for staff/volunteers?

C. Is there a training policy for staff/volunteers?

D. Are there continuing training opportunities for staff (paid and volunteer) who have completed basic skills training (staff training sessions, IWRC and NWRA programs, etc.)?

E. Is there a liability insurance policy for volunteers to protect the facility and/or organization?

F. Is there a workers compensation policy for employees?

G. What after-hours services are available for emergency cases (on-call person, emergency veterinary clinic services, etc.)?

H. Are there written policies to instruct the volunteers regarding rules of the organization as they relate to animal care, reporting procedures, rules on conduct?

XVI. CONTINUING EDUCATION

A. Is pertinent information collected on wildlife rehabilitation?

B. Does the permittee's organization collect such information and share it with other members?

C. Does the permittee and/or others in the organization attend continuing education classes or conferences on wildlife rehabilitation?

Appendix A - Form 2: Sample Patient Admission Form

DATE: ____/____/____ **SPECIES:** _____ **CASE #:** ____ - _____

Age/Sex: _____ Incoming band #: _____ - _____ Tag #: _____

Time: _____ Transported by: _____ Hours Donated: _____

TO BE FILLED OUT BY PERSON PRESENTING BIRD:

Name: _____ Phone #: _____

Address: _____ City: _____ State: ____ Zip: _____

When bird was first seen: _____ When bird was captured: _____
Date/Time Date/Time

Where bird was found: city_____county_____state_____

Specific location where bird was found (in yard, etc.): _____

Please circle any information pertaining to the bird:

			easy to catch	**hard to catch**
fell from nest	cat attack	**in road**	near window	**can't stand**
nest destroyed	dog attack	**hit by car**	hit window	**limping**
found on ground	bird attack	**bleeding**	can't fly	**panting**
cold	wet	**staggering**	shot	**in a trap**
abused	oiled	**exposed to chemicals (lawn or other)**		

Additional remarks: _____

Did you feed the bird? _____ ***If yes, what & how?*** _____

What else did you do to help it? _____

Your *tax deductible* donation of $ _____ supports the care of the birds.

↓ ↓ ↓ ↓ ***FOR OFFICE USE ONLY*** ↓ ↓ ↓ ↓

Cause of Injury: abuse by humans botulism cat attack dog attack finch conjunctivitis electrocution/burns entrapment fell from nest gunshot hit by car impact nest destroyed no appt injury oiled orphaned toxicity – lead toxicity – other toxicity – pesticide undetermined

Other: _____

Type of Injury: Primary: angel wing contaminant general debilitation neurologic no appt injury orthopedic soft tissue Other: _____

Secondary: angel wing contaminant general debilitation neurologic no appt injury orthopedic soft tissue Other: _____

Disposition: Date: _____ Init: _____
EOA Euth Died Placed Transf Released
Location: _____
Band #: _____ - _____

Tests: PCV Fecal Rads Ophtho Surgery Post Toxicology Asper Micro CBC Chem
Other: _____
_____

☐ US F&WS Notification (illegal activity, E/Th species, B/G eagle) Date notified_____ Initials____

Appendix A - Form 3: Sample Patient Examination Form

PHYSICAL EXAM

DATE: ____/____/____ SPECIES: _____ CASE #: _____ - _____

TIME: _____ INITIALS: _____ WEIGHT: _____ TAG #: _____

BODY CONDITN: emaciated underweight normal overweight AGE/SEX: _____

HYDRATION: good fair poor TEMP: _____

ATTITUDE: BAR Remarks: _____

NARES: Clear Remarks: _____

BEAK/MOUTH: WNL Remarks: _____

RESPIRATION: WNL Remarks: _____

CROP: full empty Remarks: _____

GI TRACT/ABDM: WNL Remarks: _____

DROPPINGS: WNL none Remarks: _____

EYES: WNL Remarks: _____

EARS: WNL Remarks: _____

FEATHERS: WNL Remarks: _____

ECTO-PARASITES: none Remarks: _____

SKIN: WNL Remarks: _____

FEET: WNL Remarks: _____

NERVOUS SYSTEM: WNL Remarks: _____

_____

MUSCULOSKELETAL: WNL Remarks: _____

_____

INJURIES/PROBLEMS (wounds, etc.): _____

_____

_____

_____

Note: BAR = Bright, Alert, Responsive
WNL = Within Normal Limits

On Entry:	**Other:**	PCV: _____%
Dexamethasone _____		BC: _____%
D2.5LRS (SQ/IV/IO) _____		TS: _____g/dL
Antibiotics _____		**Initial Location**
PO _____		
Fecal Exam Results _____		

Appendix B - References

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Chapter 7: Final Disposition

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Appendix D - Unit Conversion Table

To change	To	Multiply by
centimeters	inches	.3937
centimeters	feet	.03281
feet	meters	.3048
gallons (U.S.)	liters	3.7853
grams	ounces	.0353
grams	pounds	.002205
inches	millimeters	25.4000
inches	centimeters	2.5400
kilograms	pounds	2.2046
liters	gallons (U.S.)	.2642
liters	pints	2.1134
liters	quarts	1.0567
meters	feet	3.2808
meters	yards	1.0936
milliliters	tablespoons	.0667
millimeters	inches	.0394
ounces	grams	28.3495
ounces	milliliters	30
ounces	pounds	.0625
pints	liters	.4732
pounds	kilograms	.4536
pounds	ounces	16
quarts	liters	.9463
square feet	square meters	.0929
square meters	square feet	10.7639
square meters	square yards	1.1960
square yards	square meters	.8361
tablespoon	milliliters	15
yards	meters	.9144

To change	To	
Celsius	Fahrenheit	multiply by 1.8 and add 32
Fahrenheit	Celsius	subtract 32 and multiply by 0.55