MASSWILDLIFE

DIVISION OF
FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581
p: (508) 389-6300 | f: (508) 389-7890
MASS.GOV/MASSWILDLIFE

Jack Buckley, *Director*

WILDLIFE REHABILITATION PERMIT APPLICATION PACKAGE

Attention Permit Applicant:

- Enclosed is the wildlife rehabilitation permit application package. When you are ready to take the exam, please contact your local MassWildlife Office:

    - Field Headquarters, Westborough: (508) 389-6360
    - Western District, Dalton: (413) 684-1646
    - Connecticut Valley District, Belchertown: (413) 323-7632
    - Central District, West Boylston: (508) 835-3607
    - Northeast District, Ayer: (978) 772-2145
    - Southeast District, Buzzards Bay: (508) 759-3406

- There is a study guide for the exam available at Mass.gov/dfw/wildlife-rehab.

- The exam covers the following topics:

    1. General Biology of Massachusetts Wildlife
    2. Treatment Methods
    3. Endangered Species (list provided in application package)
    4. Regulations (in application package)
    5. Wildlife Diseases

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APPLICATION FOR A WILDLIFE REHABILITATION PERMIT

AFTER successfully passing the wildlife rehabilitation permit exam, fill out this application form and send with check or money order to the DFW Boston office (address at bottom of page).

Fee: $10.00. Make check payable to:

"Commonwealth of Massachusetts - DFW"

Pursuant to the provisions of Chapter 131, Section 4 of the Massachusetts General Laws, and 321 CMR 2.13, I apply for a license to acquire and hereby possess sick, injured, debilitated, or orphaned wildlife and provide necessary care and treatment to return the animal to live in the wild, independent of human aid and sustenance.

NAME _____DATE OF BIRTH_____

ADDRESS_____

CITY & STATE_____ZIP_____

PHONE #_____

ORGANIZATION_____

LOCATION WHERE ANIMALS WILL BE KEPT_____

PLEASE PROVIDE THE FOLLOWING INFORMATION WITH YOUR APPLICATION

A: The wildlife species or types (such as "small mammals", "songbirds", "waterfowl", "reptiles and amphibians", etc.) of wildlife which the applicant is prepared to rehabilitate.

B: A description of the cages and other facilities which the applicant has available for rehabilitation purposes. Diagrams, drawings in scale or pictures may be used.

Division of Fisheries and Wildlife
Boston Office, 251 Causeway Street, Suite 400, Boston, MA 02114-2152
(617) 626-1591, Fax: (617) 626-1517

CONSULTANT VETERINARIAN_____

ADDRESS_____

CITY & STATE_____ZIP_____

ORGANIZATION_____

BUSINESS PHONE # _____

Do you wish to be listed on our website as a rehabilitator? (Only name, town and phone number will be listed.) YES NO

Please indicate category of wildlife for care (M= mammals R= reptiles B= birds) _____

Have you been convicted of a violation of any provision of M.G.L., c. 131 or any provision of M.G.L., c. 266 or c. 272 involving cruelty to animals, or of any provision of 321 CMR, or any related Federal statute or regulation within the past five years? No_____ Yes_____ if yes, please explain:

_____
_____
_____
_____
_____

NOTE: If you plan to rehabilitate migratory birds you must obtain a Federal Permit after you obtain your state permit.

I certify under the pains and penalties of perjury that the information provided above is true and correct to the best of my knowledge and belief.

_____ _____

SIGNATURE DATE

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SECTION 1

321 CMR: DIVISION OF FISHERIES AND WILDLIFE

2.13: Wildlife Rehabilitation.

(1) Purpose. The purpose of 321 CMR 2.13 is to provide for the care of sick, injured, debilitated, and orphaned wildlife by trained wildlife rehabilitators and to provide criteria for the issuance of permits to such wildlife rehabilitators. In accordance with M.G.L. c. 131, § 4, wildlife rehabilitators issued permits pursuant to 321 CMR 2.13(11) or 2.13(14), or persons exempted from the permit requirement pursuant to 321 CMR 2.13(15), may acquire sick, injured, debilitated, or orphaned wildlife and provide necessary care and treatment so that the animal may be returned to live in the wild independent of human aid and sustenance. Nothing in 321 CMR 2.13 shall authorize or be construed to authorize a wildlife rehabilitator permitted under 321 CMR 2.13(11) or 2.13(14) to practice veterinary medicine contrary to M.G.L. c. 112.

(2) Definitions. For the purposes of 321 CMR 2.13 and unless the context requires otherwise, the following words or phrases shall have the following meanings:

At or near the point of capture means a location within five miles of the point of capture, or within the same county in which the permittee maintains facilities inspected and approved pursuant to 321 CMR 2.13(16), provided that in the case of a permittee whose inspected and approved facilities are located in Suffolk County "at or near the point of capture" shall further include any county which borders on Suffolk County.

Contact: shall include, but not be limited to, physical contact between the public and wildlife, including the unauthorized provision of food and liquids, and also visual, auditory, or olfactory contact between the public and wildlife which may cause or result in subjecting the wildlife to stress, behavioral anomalies including taming or imprinting, or in any diminishment of the capacity of such wildlife to subsequently survive in the wild independent of human aid and sustenance.

Director: the Director of the Division of Fisheries and Wildlife, or his agent, with primary offices at 100 Cambridge Street, Leverett Saltonstall Building, Room 1902, Boston, Massachusetts 02202.

Division: the Massachusetts Division of Fisheries and Wildlife, 100 Cambridge Street, Boston, Massachusetts 02202 (tel. 617-727-3151).

Emergency Basis means the rehabilitation of six or less animals per calendar year.

Environmental Police Officer: the Director of the Division of Law Enforcement, deputy directors of enforcement, chiefs of enforcement, deputy chiefs of enforcement, environmental police officers, and such other enforcement officers of the Division of Law Enforcement as may be appointed pursuant to M.G.L. c. 21, § 6.

Person: any individual, partnership, profit or non-profit corporation, firm, business or

other commercial or non-commercial entity, club, organization, or association.

Promptly released means for birds a period not to exceed 90 days from the time of acquisition, and for mammals, a period not to exceed one year (365 days) from the time of acquisition.

Public includes, but is not limited to, all persons other than rehabilitators permitted under 321 CMR 2.13(11) and 2.13(14), members of their immediate family, providers of temporary care authorized under 321 CMR 2.13(17), veterinarians licensed under M.G.L. c. 112, Environmental Police Officers, and employees of the Division.

Rehabilitate means the provision of care and treatment to sick, injured, debilitated, or orphaned wildlife for the purpose of returning such animals to the wild in a condition which enables them to survive independent of human aid and sustenance.

Wildlife: non-domesticated amphibians, reptiles, birds, and mammals.

Wildlife Rehabilitator or Permittee: a person who has been issued a permit, or who has been exempted from the permit requirement in accordance with the provisions of 321 CMR 2.13 for the purpose of providing care, aid, and treatment to sick, injured, debilitated, or orphaned wildlife with the goal of returning such wildlife to the wild independent of human aid or sustenance.

Wildlife Rehabilitation Permit: a permit issued pursuant to 321 CMR 2.13, including a provisional wildlife rehabilitation permit and such equivalent permit as may have been issued by the Division prior to the publication of 321 CMR 2.13 in the Massachusetts Register.

(3) Scope of Permit Requirement. No person, except as otherwise authorized under provisions of M.G.L. c. 131, or as exempted in 321 CMR 2.12(11) and 321 CMR 2.13(15), shall rehabilitate wildlife without complying with the provisions of 321 CMR 2.13.

(4) Application. A person seeking a wildlife rehabilitation permit shall complete a written application on forms supplied by the Director. Completed applications shall be addressed to the Permit Section of the Division.

(5) Information. All initial permit applications shall contain the following information. Renewal applications, including applications for a provisional permit, shall include, but not necessarily be limited to, those items in 321 CMR 2.13(5)(a), (c), (h), and (i):

(a) the applicant's name, address, and telephone number where he or she can be reached between the hours of 9:00 A.M. to 5:00 P.M.;

(b) the applicant's date of birth;

(c) in the event the applicant is a corporation, partnership, firm, business or other commercial entity, club, organization or association, either public or private, the name, address, telephone number and date of birth of the president, director, head, or principal officer;

(d) the location or locations where the activity to be permitted under 321 CMR 2.13(11) or 2.13(14) will be conducted;

(e) the species or categories (such as "small mammals", "songbirds", "waterfowl", "reptiles and amphibians") of wildlife which the applicant is prepared to rehabilitate;

(f) a description of the cages and other facilities which the applicant has available for rehabilitation purposes;

(g) the name, address, and telephone number of a veterinarian registered and licensed under provisions of M.G.L. c. 112 to practice veterinary medicine in Massachusetts who is available for consultation with and advice to the applicant;

(h) the date the application was executed; and

(i) the applicant's signature, executed under the pains and penalties of perjury.

(6) Agreement. All permits issued pursuant to 321 CMR 2.13 shall be signed by the permittee. Such signature shall constitute:

(a) an agreement by the permittee to fully comply with all relevant provisions of law including, but not limited to M.G.L. c. 131, 321 CMR and all applicable conditions and restrictions of the license; and

(b) liability agreement.

(7) Qualifications. In order to qualify for a wildlife rehabilitation permit a person must:

(a) be at least 18 years of age and domiciled in the Commonwealth of Massachusetts; and

(b) pass a written examination as stipulated in 321 CMR 2.13(18) administered by the Director or his authorized agent, except as provided for in 321 CMR 2.13(15) and 2.13(20).

(8) Fees. A fee may be charged for the issuance of a wildlife rehabilitation permit and for the administration of a written wildlife rehabilitation examination. The amount of the fees shall be determined by the commissioner of administration under the provisions of M.G.L. c. 7, s. 3B, unless otherwise determined by the Legislature.

(9) Abandoned Applications. Incomplete or improperly executed applications shall be treated as provided for in 321 CMR 2.12(8).

(10) Denial. Applications for a wildlife rehabilitation permit shall, unless otherwise provided, be denied when:

(a) the applicant has within five years preceding the date of application been assessed a civil or administrative penalty for, or been convicted of a violation of any provision of M.G.L. c. 131, or of any provision of M.G.L. c. 266 or c. 272 involving cruelty to animals, or of any provision of 321 CMR, or of any federal statute or regulation which is related to the activity for which the permit is sought;

(b) the applicant has failed to disclose material information or has made false statements as to any fact in connection with the application;

(c) the applicant has failed to submit the required fee with the application, unless the applicant is exempt from such fee as provided in 321 CMR 2.13(15), or unless no fee has been established;

(d) an inspection by a duly authorized state or federal official of the facilities where wildlife will be maintained has disclosed that the facilities do not meet the requirements established at 321 CMR 2.13(16);

(e) the applicant fails, when required, to fulfill the examination requirements established at 321 CMR 2.13(18); or

(f) the applicant fails, when required, to meet the recertification requirements established at 321 CMR 2.13(19).

(11) Permit. A wildlife rehabilitation permit may be issued to a person based on his or her demonstrated experience, successful completion of a written examination, the availability of adequate facilities at his or her rehabilitation site or sites, and other provisions of 321 CMR 2.13.

(12) Provisional Permit. A provisional wildlife rehabilitation permit may, at the discretion of the Director, be issued to an applicant in accordance with the provisions of 321 CMR 2.13(11) and 2.13(14).

(13) Expiration Date. The expiration date for a wildlife rehabilitation permit shall be midnight of December 31 in the calendar year. The expiration date of a provisional wildlife rehabilitation permit shall not exceed 180 days from the date of issuance.

(14) Provisional Status. Upon receipt of a properly executed application and the completion of a satisfactory inspection of the applicant's facilities, a person who has held a wildlife rehabilitation permit for at least one full calendar year, but for less than three full calendar years, immediately prior to the publication date of 321 CMR 2.13 in the Massachusetts Register may be granted a provisional wildlife rehabilitation permit. A provisional wildlife rehabilitation permit authorizes the permittee to carry out all activities of a wildlife rehabilitator until such time as the applicant passes or fails the

written examination. Such examination shall be taken within 180 days following the issuance of a provisional wildlife rehabilitation permit. A person may hold a provisional wildlife rehabilitation permit for a period not to exceed 180 days. A person who, having passed the written examination and been issued a wildlife rehabilitation permit, shall not subsequently be issued a provisional wildlife rehabilitation permit. A provisional wildlife rehabilitation permit held by any person who fails the written examination shall automatically be void. A person who has not held a wildlife rehabilitation permit for at least one full calendar year immediately prior to the publication of 321 CMR 2.13 in the Massachusetts Register shall not be grandfathered or granted provisional status.

(15) Exemptions. The following exemptions shall apply to veterinarians properly licensed in the Commonwealth:

(a) Veterinarians licensed under the provisions of M.G.L. c. 112 who rehabilitate animals only on an emergency basis shall be exempt from the fees, permit, inspection, examination, and recertification requirements of 321 CMR 2.13(8), 2.13(11), 2.13(16), 2.13(18), and 2.13(19) provided that such veterinarians comply with 321 CMR 2.13(22), 2.13(24) and all other provisions of 321 CMR 2.13 wherein not specifically exempted. Veterinarians exempted under 321 CMR 2.13(15)(a) shall not advertise or otherwise promote their services as a wildlife rehabilitator.

(b) Veterinarians licensed under the provisions of M.G.L. c. 112 who rehabilitate or intend to rehabilitate animals on a regular basis or who advertise or promote or intend to advertise or promote their services as a wildlife rehabilitator and who are not otherwise exempt under the provisions of 321 CMR 2.13(15)(a) shall be exempt from the fees and examination requirements of 321 CMR 2.13(8) and 2.13(16), provided that such veterinarians comply with all other provisions of 321 CMR 2.13.

(16) Inspections. Upon receipt of a properly executed application for a wildlife rehabilitation permit and all required supporting documentation, an Environmental Police Officer or an official of the Division or both shall inspect the facilities to be used by the applicant for the rehabilitation of wildlife and shall certify that they meet or fail to meet the minimum requirements established in 321 CMR 2.12(16) or requirements otherwise established by the Director. Wildlife rehabilitation facilities and records, including those of persons exempted under 321 CMR 2.13(15)(a), shall be available for inspection by Environmental Police Officers or officials of the Division at any reasonable hour in order to examine or inspect the conditions, standards, and methods of care and keeping of wildlife. The applicant agrees as a condition to a renewal of his or her application that the facilities and records will be subject to periodic and unannounced inspections at reasonable hours. When authorized by the Director, Environmental Police Officers or officials of the Division may order that specific wildlife be released, transferred, surrendered, or humanely destroyed, and may seize and remove wildlife from the custody of the permittee if they deem it necessary for the welfare of such wildlife, of other wildlife, of domestic animals, for the welfare and safety of humans, or for failure to comply with any provision of the permit, or 321 CMR 2.12, or 2.13.

(17) Temporary Care. Any other person may care for the wildlife held by a permittee when authorized in writing by the permittee provided that if the period of care exceeds 30 days the Director shall be notified in writing of such temporary care provisions within three calendar days from the inception of temporary care. Such written notification shall include the name or names of the persons providing temporary care, the reason or need for temporary care status, and the number of days temporary care is to be maintained. Nothing in 321 CMR 2.13(17) shall be construed to allow the provision of temporary care at facilities other than those approved and inspected pursuant to 321 CMR 2.13(16) unless so approved in writing by the Director. An Environmental Police Officer or an official of the Division may remove wildlife from temporary care when such temporary care has been instituted contrary to provisions of 321 CMR 2.13(17) or for those reasons specified in 321 CMR 2.13(16). Those persons specified in 321 CMR 2.13(10)(a) may not be authorized to perform temporary care.

(18) Examination Requirements:

(a) Except as provided in 321 CMR 2.13(15) and 2.13(20), applicants for a wildlife rehabilitation permit shall successfully complete a written examination relating to biology, care, handling, diets, animal welfare, statutes and regulations, and such other appropriate subject matter as shall be determined by the Director. A person must attain a passing grade as determined by the Director. An applicant who fails may not be eligible to retake the examination for two months from the date of the failed examination.

(b) The maximum duration of a provisional wildlife rehabilitation permit shall be 180 days. If the written examination is not passed within the above stated time period for provisional status, the applicant shall no longer be authorized to possess and rehabilitate wildlife until such time as the written examination is successfully completed.

(19) Periodic Recertification. Except as provided in 321 CMR 2.13(15)(a), proof of participation in a wildlife rehabilitation seminar, workshop, or training session approved by the Director, at least once in every three consecutive years shall be required for continued renewal of a wildlife rehabilitation permit. Failure to complete such periodic recertification by December 31 of the third calendar year following the most recent renewal, or issuance of the initial permit, whichever is most recent, shall result in non-renewal of the permit until such time as the recertification requirement is satisfied.

(20) Grandfather Clause. All persons who held a valid wildlife rehabilitation permit for three or more consecutive years immediately prior to the initial publication of 321 CMR 2.13 in the Massachusetts Register shall be exempt from the written examination requirement set forth in 321 CMR 2.13(18). However, such grandfathered persons shall not be exempt from the recertification requirements set forth in 321 CMR 2.13(19).

(21) Revocation and Non-Renewal. A wildlife rehabilitation permit, or an exemption pursuant to 321 CMR 2.13(15), may be revoked by the Director at any time upon failure to comply with any condition of the permit, or 321 CMR 2.13, or failure to provide the care and treatment necessary to prepare wildlife held under authority of the permit for

successful release to the wild. Wildlife possessed or maintained by a person whose permit or exemption has been revoked or which has not been renewed shall be disposed of by that person in a manner required in writing by the Director. Any wildlife not disposed of may be seized by an Environmental Police Officer or official of the Division and disposed of in the best interest of the Commonwealth.

(22) Restrictions:

(a) A wildlife rehabilitation permit may not authorize the rehabilitation of endangered or threatened wildlife as provided for in 321 CMR 10.60, venomous snakes, black bear, moose, or white-tailed deer. All wildlife held under authority of a wildlife rehabilitation permit may not be maintained as pets, intentionally tamed, transferred to a person not properly licensed or otherwise authorized, sold, exchanged for consideration, bartered, maintained in unapproved facilities or by unauthorized persons, or maintained for a period longer than that specified in 321 CMR 2.13(22). All wildlife which has recovered from disease, injury, or debilitation, or successfully raised as an orphan, shall be promptly released into the wild at or near the point of capture unless otherwise instructed by the Director. The Director may authorize in writing a longer holding period or release site when, in his judgement, such holding period or release site is necessary for the welfare of the wildlife so held or released and is not detrimental to human health and safety or the health and welfare of free-ranging wildlife or domestic animals.

(b) Wildlife, except endangered, threatened, or special concern species listed in 321 CMR 10.60 for which recovery from disease, injury, or debilitation, in the permittee's judgement is not anticipated, shall be donated to an approved zoo, museum, or natural history organization, or shall be euthanized, unless the permittee is otherwise instructed by the Director. Orphaned wildlife which, in the judgement of the permittee, cannot be released to the wild due to a lack of behavioral traits enabling such wildlife to survive without dependence on human aid and sustenance, or to imprinting on humans, shall be disposed of as stipulated in 321 CMR 2.13(22)(b). Dead wildlife shall be transferred to the Division upon request of the Director. If not requested by the Director dead wildlife shall be disposed of at an approved museum, or scientific or educational institution, or disposed of by lawful incineration or burial. The Director reserves the right to make final judgement as to the capacity of wildlife to recover from disease, injury, or debilitation, or for orphans to be successfully reared and released. He may direct the disposal of such wildlife by transfer to another rehabilitator, release to the wild, or euthanasia when, in his judgement, the health, welfare, and safety of such wildlife, the public, free-ranging wildlife, or domestic animals shall be best served by such disposal. In making such judgements, the Director may consult with veterinarians, rehabilitators, or such other experts or qualified persons as he shall deem advisable.

(c) The acquisition of endangered, threatened, or special concern wildlife, as listed in 321 CMR 10.60, whether dead or alive, shall be reported immediately to the Division for special instructions relative to the disposition of such wildlife. In the case of an acquisition on a Saturday, Sunday, or legal holiday it shall be reported on the work day, Monday-Friday, immediately following.

(d) A federal permit issued by the U.S. Fish and Wildlife Service or such other federal agency as may have jurisdiction shall be obtained by the permittee prior to receiving or rehabilitating any wildlife protected by federal law. This shall not preclude emergency care by licensed veterinarians pursuant to 321 CMR 2.12(11). Salvage and rehabilitation of raptors by falconers licensed under provisions of 321 CMR 3.04 may only be undertaken in accordance with the provisions of 321 CMR 3.04 and other applicable state and federal law.

(e) No public contact shall be allowed with any wildlife held under a wildlife rehabilitation permit unless otherwise approved in writing by the Director.

(23) Costs. Any costs, charges, or fees, including but not limited to shelter, equipment, labor, veterinarian or other specialist consultation or services, transportation, federal or other licensing fees, and any other expenses associated with the rehabilitation of wildlife shall be the responsibility of the permittee. The permittee shall not charge the Director, the Division or any third party for such costs or expenses. Donations may be accepted if otherwise permitted by law.

(24) Reporting Requirements. An annual report shall be filed with the Permit Section of the Division at the end of each calendar year. Such report shall be filed no later than January 31 for the preceding calendar year. The report shall be on forms provided by the Director or in a format specified by the Director and shall report full details on the wildlife handled or rehabilitated, including, but not limited to, species, number of individuals, acquisition source, reason for acquisition, disposition, and such other information as the Director may require. Failure to submit such annual report or failure to provided required information or the making of false statements shall be cause for suspension, revocation, or non-renewal of the permit.

(25) Compliance with Other Laws. Issuance of a wildlife rehabilitation permit under 321 CMR 2.13 shall not exempt the permittee from compliance with the provisions of any other local, state, or federal law.

Regulatory Authority: M.G.L. c. 131, § 4.

2.12: Artificial Propagation of Birds, Mammals, Reptiles, and Amphibians.

(15) Inspections. Upon submission of a properly completed application for a Class 4 license to be issued pursuant to 321 CMR 2.12(3) or for a wildlife rehabilitation permit issued under authority of M.G.L. c. 131, § 4, clause 2, and all required supporting documentation, an Environmental Police Officer or an official of the Division of Fisheries and Wildlife, or both, shall inspect the facilities to be used by the applicant for the maintenance of the following animals: any mammal in the order Carnivora (wild cats, wolves, bears, raccoons, weasels, and others); any mammal in the order Proboscidea; any mammal in the families Cervidae (deer, elk, and others) and Bovidae (bison, antelope, etc.); any bird in the orders Casuariiformes (emus), Rheiformes (rheas) and Struthioniformes (ostriches); and any venomous reptiles. If, upon receiving a properly completed application for a Class 4 license for any other species, the Director determines that an inspection of the applicant's facilities is in the public interest, he may cause such inspection to be made by an official of the Division or an Environmental Police Officer or both. An applicant's facilities, whether or not inspected as provided in 321 CMR 2.12(15), shall meet the following minimum requirements:

(a) animals shall be kept in approved enclosures under conditions that give the licensee exclusive control over them at all times and at the location(-s) to be designated in the license, except as otherwise provided by law or the Director;

(b) approved enclosures shall be designed so as to provide adequate physical comfort to the animal and shall: 1. keep the animal clean and dry, except for those species requiring a moist environment; 2. maintain an ambient temperature compatible with the animal's needs; 3. keep the animal in complete and continuous captivity; 4. restrict the entry of unauthorized persons or predatory animals; 5. provide access to clean food and fresh water in clean containers; and 6. sufficient fresh food and water fulfilling the animal's dietary requirements shall be made available and shall be presented in a manner compatible with the animal's particular eating habits;

(c) maintain all enclosures in a sanitary condition and in good repair;

(d) have equipment available for proper storage and disposal of waste material to control vermin, insects and obnoxious odors;

(e) take effective measures to prevent and control infection and infestation of the animal and premises with disease, parasites and vermin;

(f) provide adequate shelter for the comfort of the animal and adequate facilities, when necessary, for isolation of diseased animals;

(g) if animals are group housed, maintain animals in compatible groups without overcrowding;

(h) ensure the enclosures are adequately designed to minimize any potential danger to the public, or to the licensee;

(i) in the case of venomous reptiles, arrange for antivenin to be readily available through a local hospital, the name, address and telephone number of which shall be affixed to the enclosure; and

(j) provide for the maintenance or disposition of all animals in case of the licensee's absence, illness, or death.

(k) comply with any special conditions or restrictions as stipulated by the Director, pursuant to 321 CMR 2.12(16).

(16) Restrictions. Applications for a license issued pursuant to 321 CMR 2.12(3) shall comply with the following restrictions:

(a) Animals may be procured in the following manner only:

1. lawfully propagated, harvested, or taken outside of Massachusetts; or
2. lawfully propagated within Massachusetts; and 3. unless otherwise provided for by the Director, animals taken from the wild within Massachusetts may not be propagated, cultivated or maintained for purposes of sale pursuant to M.G.L. c. 131, § 23.

(b) Birds and mammals possessed and maintained under authority of a class 5 license shall be liberated into the wild within one year under the supervision of and in covers approved by the Director.

(c) Birds and mammals sold for food purposes must first be killed and to each carcass or part thereof shall be attached a tag furnished by the Director at a cost to the licensee established by the Department of Administration and Finance. This tag shall remain on the carcass or any portion thereof until the bird or mammal is prepared for consumption.

SECTION 2

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.

RELEASE CRITERIA

1. What kind of weather conditions will the animal encounter after it is released? Is it in good enough physical condition to withstand those conditions?

2. Is the animal at a normal body weight for its sex, species, and age? Note: In some species the male normally weighs less than the female. Fledgling birds sometimes weigh more than adults (swallows) or sometimes less (killdeer). Most bird weights can be located in one or more publications. See Weights of 687 North American Birds booklet.

3. What injuries did the animal recover from? Can it fly or run properly? Can it angle and turn? What about stamina? Does it pant after only a few minutes of exercise? Can the animal see? Does it have a sense of depth perception (especially critical with one damaged or enucleated eye)? Is it heavily parasitized? Is it anemic? Are the stools normal? Can it hear? What condition are the feathers in (i.e. are there stress marks or broken feathers)?

4. Is the animal waterproof (most birds really should be to some extent)?

5. Can it be returned into an area where others of its kind currently reside? Some species migrate out and it is not a good idea to release a migratory fledgling after all of its kind has gone south for the winter when it has been raised in captivity. It is hard enough to migrate with friends, little alone, by yourself.

6. If a resident species, is the location one with territories available for new animals or is ti already very crowded for that species? Our rehab babies are the “new guys on the block” and as such may get pushed into peripheral territories. As those areas habitable?

7. What are the hunting, trapping, and housing pressures of the area? The first few days of the “harvest” season often have the most hunting pressure. Postponing a release by a week may expose the animal to lower hunting pressure.

8. Is the animal acclimated to outside ambient temperatures? Very important!

9. Does the animal recognize native food items? We would rather not have them looking for dog food in the wild. Can it kill live food without being injured.

10. Does the animal recognize dogs/cats as friend or foe? How about people? This can be really dangerous with predators (coyotes, raccoons, bobcats).

SECTION 3

BASIC REQUIREMENTS FOR HOUSING WILD ANIMALS IN REHABILITATION

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

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.

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.

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.

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.

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 that 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.

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.

AVIAN HOUSING REQUIREMENTS

Overview

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.

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.

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.

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.

Housing for Songbirds

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.

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.]

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 "Avian Housing Requirements"

Order	**Length of Bird**	**Restricted Activity** (WxLxH)	**Limited Activity** (WxLxH)	**Unlimited Activity** (WxLxH)	**Max#**	**Codes**
Columbiformes	>9"	12"x12"x12"	12"x12"x128	16'x8'x8'		P, Pi, Q
(Pigeons, Doves)					8 12	
Cuculiformes (Cuckoos)	<12" >12"	18"x18"x18" 24"x24"x24"	24"x24"x24" 36"x36"x36"	8'x8'x8' 16'x8'x8'	4-6 4-6	P, Q 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" >9"	12"x12"x12" 18"x18"x18"	18"x18"x18" 24"x24"x24"	4'x8'x8' 8'x16'x8'	2-4 2-4	C, D, H, W C, D, H, W
Passeriformes (Perching & Songbirds, Swallows)	<5" >5"	7"x11"x5" 12"x12"x12"	12"x17"x7" 18"x18"x18"	2'x4'x4' 4'x8'x8'	4 4-6	H, P, Z H, P, Z, W
Corvidae (Crows, Ravens & Magpies)	<17" >17"	14"x18"x18" 16"x22"x22"	24"x18"x24" 24"x24"x24"	8'x16'x8' 10'x30'x15'	6 6	P P
Galliformes (Quail, Pheasants)	<20" >20"	2'x2'x2' 3'x3'x3'	3'x3'x3' 4'x4'x8'	4'x4'x8' 8'x12'x8'	4 4	H 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, meal worms 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.

MAMMAL HOUSING REQUIREMENTS

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.

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).

<u>Marsupialia (Opossums):</u> 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.

<u>Chiroptera (Bats):</u> 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 "Mammal Housing Requirements"

Order/ Family	**Infant Care** (WxLxH)	**Nursing/ Pre-weaned** (WxLxH)	**Juvenile or Adult Outside** (WxLxH)	**Initial Injured Adult Inside** (WxLxH)
Marsupialia				
Opossum	(L) 10 GAL.	(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.)				
Squirrels		(L) 3x3x3	(1) 4x4x8	(1) 2x2x2
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 Squirrel	(L) 15GAL.	(L) 15GAL.	(L) 2x2x2	(1) 2x2x2
Golden-mantled Squirrel & 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"
(2-6 weeks)		18"x18"x12"		
(6-12 weeks)		10'x10'x4' (1)		
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

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.

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.

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.

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 the Reptile Housing Requirements section.

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

SECTION 4

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 delegates 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 sub-permittee to 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 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.

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.

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, recordkeeping, 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

SECTION 5

DISEASE CONTROL

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.

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.

Standards to Prevent Disease Transmission within the Facility

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 the Public Health Responsibilities section.
- There must be separate refrigeration facilities for food (animal food kept separate from human food) and for carcasses and postmortem specimens.

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.

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.

Disinfection

Disease control and prevention are the obvious "whys" of facility cleanliness. The following information pertains to the "hows" of creating and maintaining a clean facility.

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.

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.

SECTION 6

Books and Manuals of Interest for Wildlife Rehabilitators:

Wild Animal Care and Rehabilitation Manual
By Vicki Johnson and Patricia Adams
Published by Beech Leaf Press, 4th Edition
Kalamazoo Nature Center, Inc.
7000 North Westnedge Ave
Kalamazoo, Michigan 49007
616-381-1574

Basic Wildlife Rehabilitation 1AB
International Wildlife Rehabilitation Council
4437 Central Place, Suite B-4
Suisun, CA 94585
707-864-1761

Wild Mammals of New England
Alfred J. Godin The John Hopkins
University Press Baltimore &
London

The Wild Mammals of Missouri
By Charles and Elizabeth Schwartz
University of Missouri Press and
Missouri Department of Conservation
P.O. Box 1644 Columbia,
Missouri 65211

New England Wildlife: Habitat, Natural History & Distribution
Richard M. De Graff & Deborah D. Rudis
US Department of Agriculture Forest Service
Northeastern Forest Experimental Station
General Technical Report NE-108

American Wildlife & Plants A Guide to Wildlife Food Habits
Martin, Zim & Nelson
Dover Publications Inc., New York
(out of print)

Any of the **Peterson Field Guide Series** and **Audubon Society Field Guides**
Would be helpful for identification and natural history.

The Field Guide to Wildlife Habitats of the Eastern United States
Janie M. Benyus
A Fireside Book, Published by Simon & Schuster Inc.
New York, NY

Hawks, Owls and Wildlife
John Craighead and Frank Craighead Jr.
Dover Publications Inc.
180 Varick Street
New York, NY 10014

Care & Rehabilitation of Injured Owls
Lay McKeaver, The Owl Rehabilitation Research Foundation
Published by W.F. Rannie
P.O. Box 700 Beamsville,
Ontario LOR1BO

The Birder's Handbook
By Ehrlich, Dobkin & Wheye A Fireside Book,
Published by Simon & Schuster Inc. New York, NY

Medical Management of Birds of Prey
Patrick T. Redig, DVM, Ph.D.
The Raptor Center at the University of Minnesota
1920 Fitch Avenue
St. Paul, MN 55108
612-624-4745

Minimum Standards for Wildlife Rehabilitation (1994)
By the National Wildlife Rehabilitators Association & International Wildlife Rehabilitation Council
*Topics: Statement of purpose, Code of ethics, Basic requirements for housing Of wild animals, Recording requirements, Statistical standards, Veterinary policy, Euthanasia standards, Disease prevention, Rehab facility review

Introduction to Wildlife Rehabilitation (1986)
*Topics: Getting started. Telephone tips. Record keeping. Animal handling. Tube feeding. Weaning parameters. Nestling identification.
National Wildlife Rehabilitators Association (NWRA)
14 North 7th Avenue
St. Cloud, MN 56302

Quick Reference (1993)
*Topics: Glossary, Abbreviations. Tables; fluids & caloric requirements, normal temperature & pulse. Calculations; Kcals/day, drug dosing,
National Wildlife Rehabilitators Association (NWRA)
14 North 7th Avenue
St. Cloud, MN 56302

Wildlife Care and Rehabilitation
Patti L. Raley
The Bruckner Nature Center
5995 Horseshoe Bend Road
Troy, Ohio 45373
513-698-6493

New York State Wildlife Rehabilitation Study Guide and Examination Booklet
Return a Gift to Wildlife. . .Again
Published by NYSDEC (New York State Department of Environmental Conservation)
50 Wolf Road
Albany, NY 12233-4780

MEMBERSHIP ORGANIZATIONS:

Wildlife Rehabilitators' Association of Massachusetts, Inc. (WRAM)
25 Tami Court
Bridgewater, MA 02324-1236
508-279-3936
(Holds an Annual Conference usually in February, produces a newsletter and a Rehabilitators' Directory for members.)

National Wildlife Rehabilitators Association (NWRA)
2625 Clearwater Road, Suite 110
St. Cloud, MN 56301
320-230-9920
(Annual Conference, newsletter, directory and other publications)
www.nwrawildlife.org

International Wildlife Rehabilitation Council (IWRC)
PO Box 8187
San Jose, CA 95155
408-271-2685
www.iwrc-online.org

New York State Wildlife Rehabilitation Council, Inc. (NYSWC)
PO Box 246
Oswego, NY 13827
www.nyswrc.org

MAGAZINES:

Wildlife Rehabilitation Today
Coconut Creek Publishing Company
2201 NW 40th Terrace
Coconut Creek, FL 33066-2032

Massachusetts Wildlife
Division of Fisheries and Wildlife
Field Headquarters
One Rabbit Hill Road
Westborough, MA 01581-9990

SECTION 7

10.90: List of Endangered, Threatened, and Special Concern Species

(1) Introduction. The list in 321 CMR 10.90 contains the names of all species of plants and animals which have been determined to be Endangered, Threatened, or of Special Concern pursuant to M.G.L. c. 131A and 321 CMR 10.03.

(2) List Format. The columns entitled "Common Name" and "Scientific Name" define the species listed. In the "Status" columns the following symbols are used: "E" for Endangered, "T" for Threatened, and "SC" for Special Concern. The status defined under the "MA" column denotes the official status of the species in Massachusetts pursuant to M.G.L. c.131A and 321 CMR 10.00. The status under the "US" column is the status of the species under the federal Endangered Species Act at the time of the latest revision of 321 CMR 10.00 and is given for informational purposes only. Recent changes in the federal list might not be reflected on this list. The U.S. Fish and Wildlife Service should be consulted for official and up to date information on the federal status of any species. Inquiries may be made by writing to U.S. Fish and Wildlife Service, 70 Commercial Street, Suite 300, Concord, NH 03301-5087. The "Taxonomic Family/Taxonomic Group" column of the list is included for the purpose of organization. The "Notes" column directs the reader to footnotes which further define or clarify the status of a species or alternative names of species.

(3) Organization of the List. The list is generally organized according to the relationship of the listed species as determined by the science of taxonomy, which groups and categorizes species that are similar on the basis of shared evolutionary descent. The most basic division in the list is between animals and plants. Within animals the list is divided between vertebrates (animals with backbones) and invertebrates (animals without backbones). Within vertebrates, invertebrates, and plants the list is further divided into categories which are generally recognized, such as fish, mammals, dragonflies, and violets. All such information has no regulatory effect and is provided only for the purpose of organizing the list. The following outline shows the taxonomic categories used and their order. A species name index is provided after the list at 321 CMR 10.91 to assist the reader in finding species on the list.

(4) The List. The Massachusetts List of Endangered, Threatened, and Special Concern species follows:

Common Name	Scientific Name	MA Status	Fed Status	Notes
Fish				
American Brook Lamprey	*Lampetra appendix*	T		
Shortnose Sturgeon	*Acipenser brevirostrum*	E	E	
Atlantic Sturgeon	*Acipenser oxyrinchus*	E		
Lake Chub	*Couesius plumbeus*	E		
Eastern Silvery Minnow	*Hybognathus regius*	SC		
Bridle Shiner	*Notropis bifrenatus*	SC		
Northern Redbelly Dace	*Phoxinus eos*	E		
Longnose Sucker	*Catostomus catostomus*	SC		
Burbot	*Lota lota*	SC		
Threespine Stickleback	*Gasterosteus aculeatus*	T		1
Amphibians				
Jefferson Salamander	*Ambystoma jeffersonianum*	SC		2
Blue-Spotted Salamander	*Ambystoma laterale*	SC		3
Marbled Salamander	*Ambystoma opacum*	T		
Eastern Spadefoot	*Scaphiopus holbrookii*	T		
Reptiles				
Loggerhead Seaturtle	*Caretta caretta*	T	T	
Green Seaturtle	*Chelonia mydas*	T	T	
Hawksbill Seaturtle	*Eretmochelys imbricata*	E	E	
Kemp's Ridley Seaturtle	*Lepidochelys kempii*	E	E	

Leatherback Seaturtle	*Dermochelys coriacea*	E	E	
Wood Turtle	*Glyptemys insculpta*	SC		
Bog Turtle	*Glyptemys muhlenbergii*	E	T	
Blanding's Turtle	*Emydoidea blandingii*	T		
Diamond-backed Terrapin	*Malaclemys terrapin*	T		
Northern Red-bellied Cooter	*Pseudemys rubriventris*	E	E	4
Eastern Box Turtle	*Terrapene carolina*	SC		
Eastern Wormsnake	*Carphophis amoenus*	T		
Eastern Ratsnake	*Pantherophis alleghaniensis*	E		
Copperhead	*Agkistrodon contortrix*	E		
Timber Rattlesnake	*Crotalus horridus*	E		
Birds				
Common Loon	*Gavia immer*	SC		
Pied-Billed Grebe	*Podilymbus podiceps*	E		
Leach's Storm-Petrel	*Oceanodroma leucorhoa*	E		
American Bittern	*Botaurus lentiginosus*	E		
Least Bittern	*Ixobrychus exilis*	E		
Bald Eagle	*Haliaeetus leucocephalus*	E		
Northern Harrier	*Circus cyaneus*	T		
Sharp-Shinned Hawk	*Accipiter striatus*	SC		
Peregrine Falcon	*Falco peregrinus*	E		
King Rail	*Rallus elegans*	T		
Common Moorhen	*Gallinula chloropus*	SC		
Piping Plover	*Charadrius melodus*	T	T	
Upland Sandpiper	*Bartramia longicauda*	E		
Roseate Tern	*Sterna dougallii*	E	E	
Common Tern	*Sterna hirundo*	SC		
Arctic Tern	*Sterna paradisaea*	SC		
Least Tern	*Sternula antillarum*	SC		
Barn Owl	*Tyto alba*	SC		
Long-Eared Owl	*Asio otus*	SC		
Short-Eared Owl	*Asio flammeus*	E		
Sedge Wren	*Cistothorus platensis*	E		
Golden-Winged Warbler	*Vermivora chrysoptera*	E		
Northern Parula	*Parula americana*	T		
Blackpoll Warbler	*Dendroica striata*	SC		
Mourning Warbler	*Oporornis philadelphia*	SC		
Vesper Sparrow	*Pooecetes gramineus*	T		
Grasshopper Sparrow	*Ammodramus savannarum*	T		
Henslow's Sparrow	*Ammodramus henslowii*	E		
Mammals				
Water Shrew	*Sorex palustris*	SC		
Rock Shrew	*Sorex dispar*	SC		
Indiana Myotis	*Myotis sodalis*	E	E	
Small-Footed Myotis	*Myotis leibii*	SC		
Southern Bog Lemming	*Synaptomys cooperi*	SC		
Sperm Whale	*Physeter catodon*	E	E	
Fin Whale	*Balaenoptera physalus*	E	E	
Sei Whale	*Balaenoptera borealis*	E	E	

Blue Whale	*Balaenoptera musculus*	E	E	
Humpback Whale	*Megaptera novaeangliae*	E	E	
Northern Right Whale	*Eubalaena glacialis*	E	E	