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PROBLEM ANIMAL CONTROL HANDBOOK
(3rd Edition)

GOVERNMENT DOCUMENTS
COLLECTION

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MASSACHUSETTS DIVISION OF FISHERIES AND WILDLIFE
100 CAMBRIDGE STREET, BOSTON, MASS.
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PROBLEM ANIMAL CONTROL HANDBOOK

This handbook is intended as a guide for persons licensed as problem animal control agents in accordance with the Code of Massachusetts Regulations, 321 CMR 2.14. This is the third edition of the handbook. Other sources, including, but not restricted to, those suggested below, may provide useful additional information.

The Division of Fisheries and Wildlife (DFW) is the state agency which has jurisdiction and responsibility for regulating, managing, and studying the inland fisheries and wildlife resources of the state and the habitats of these species. All freshwater fish, amphibians, reptiles, birds, and mammals are protected by state law and may not be possessed, killed, harmed, harassed, hunted, bought or sold, or otherwise taken or molested unless there is a provision in state law which allows this, or unless DFW issues a permit or license allowing it. In addition, some species are also protected by Federal law. Problem Animal Control Agents (PAC Agents) are licensed (issued permits) by DFW in accordance with provisions of G.L. c. 131, § 4 and 321 CMR 2.14. The purposes of such licensing is to provide a lawful procedure for the control of vertebrate animals which are causing damage to property or interfering with the reasonable use of such property. Under some circumstances, landowners, members of their immediate families, or persons permanently employed by them may control or destroy problem animals without a permit (G.L. c. 131, s. 37). However, this may not be satisfactory due to the need for special training or equipment or the lack of time or ability on the part of the complainant. Problem Animal Control Agents, including municipal Animal Control Officers, can therefore provide such services, when properly licensed. No person, unless otherwise allowed by law, may control problem animals without such licensing from DFW.

Regulations:

The complete text of the Problem Animal Control regulations is found in the Code of Massachusetts Regulations (321 CMR 2.14), initially published in the Massachusetts Register in May 1989. Prior to 1989, licensing was also required but was governed by administrative policy. The current regulations set forth the purpose for the regulations, the scope of the permit requirement, the information and requirements necessary for application, procedures for administering abandoned and denied applications, criteria for issuance of the permit and for provisional permits, exemptions, examination and recertification requirements,

procedures for revocation and non-renewal of permits, restrictions, record-keeping and reporting requirements, and other information. A copy of these regulations is contained in this handbook. Permittees must be familiar with all aspects of the regulations and must comply with them in conducting their animal control program.

Examination and Recertification Requirements:

Prior to 1989, Problem Animal Control Agents could obtain and renew their permits by applying and by being recommended by a DFW District Wildlife Manager or an Environmental Police Officer. Under the formal regulations now in place, a new applicant must also complete a written examination on biology, handling, capture techniques, animal welfare, diseases and parasites, statutes and regulations, and other appropriate subject matter before being granted a permit. They must also successfully complete a trapper training course. In order to phase in existing permittees, persons who have held a problem animal control permit for three or more years were allowed to renew without completing the examination. Persons who had held such a permit for more than one but less than three years were allowed to renew, but then required to take the examination within six months in order to retain the permit. All of these 1-year provisional permittees have now been phased into the program. In any case, all permittees must retake an examination (recertify) every third year. In past years, there has been no fee either for taking the examination or for issuance of the permit. Such fees may be instituted in the future. Questions on the examination will be based on, but not be limited to, materials in this handbook. Municipal Animal Control Officers may be exempted from the examination and recertification requirements and the fees (if any) when the DFW Director is satisfied that their training and experience warrants such exemption. The ACO certification program being conducted through the Criminal Justice Training Council can provide such training and experience.

Control Philosophy:

The Problem Animal Control Agent has a divided responsibility. He or she has a responsibility to the client to solve the animal problem which the client has complained about. The agent also has a responsibility to the state and to society to act lawfully and ethically. They also have a responsibility to the animals to act humanely. It is a challenging task to meet all these responsibilities all of the time. In many, if not most, instances, it is not the animal which is the problem, but rather the human. Humans have intruded their habitat into that of the animals,

who have taken advantage of human artifacts for food and shelter. This exploitation of human resources by animals is often considered to be a "problem" or a "nuisance" by those who encounter it. These problems are often real, and need to be resolved, but the actual problem is not the animal-- which is acting in accordance with its biological needs-- but the interaction between the animal and human. By eliminating the situations which elicit those interactions, problems can often be reduced or eliminated. In other words, prevent the problem from occurring-- by physical barriers, sanitary disposal of garbage, or by tolerating a low level of damage. Secondly, problem animals may sometimes be harassed or chased away. Problem Animal Control Agents should, whenever possible, recommend and utilize exclusionary measures or non-lethal controls over lethal measures for controlling problem animals. On the other hand, when human health and safety, or that of domestic animals, is immediately threatened, or when a high level of severe damage is occurring, immediate and humane destruction of the animal may be warranted. Agents should advise their clients of those measures which can be utilized to prevent damage in the future. Persons should be attentive to problems which might occur elsewhere nearby. It does little good-- to either the animals or to humans-- to merely shift damage from place to place.

Capture of Problem Animals:

Those means which are allowed for the taking of problem animals are specified in the regulations. In some instances, these include lethal means such as shooting or kill-type traps. In other instances, capture may be accomplished by live holding devices such as cage traps or nets. The animal's welfare should be considered and needless pain and suffering should be avoided. All capture devices have inherent conditions or contradictions which may limit their use and effectiveness and Problem Animal Control Agents must be familiar with those devices which they use. For example, cage or "box" traps may capture the animal harmlessly, but the animals may become dehydrated if the trap is left in the sun for long periods, or the trap may be vandalized. Captured animals may also damage their teeth by gnawing at the mesh of wire traps. Be sure that you know your equipment and its limitations.

PAC Agents must comply with most (but not all) of the fur trapping regulations, 321 CMR 3.02(5). These are detailed and are subject to frequent change. Many of the relevant provisions of these trapping regulations have been incorporated into the Problem Animal regulations, but you should read both regulations carefully to be sure that you are acting properly. You will learn much of this information when you take the required trapper training course.

Disposal of Problem Animals:

In some instances, it will be necessary to kill problem animals, either because of the nature of the damage, or because the problem is caused by a sick or injured animal. It can be distressing to the agent or the client to have to kill animals and exclusionary or non-lethal means are preferred when possible and practical. When it is necessary to destroy animals, the method used should be as quick and painless as possible, depending on the urgency of the matter and the kind and size of animal involved. Keeping this in mind, suggested means of euthanasia include: shooting in the brain with a firearm (suspected rabid animals should be shot in the heart); chemical euthanasia by lethal injection; cervical dislocation (small birds and mammals); and drowning. Shooting should be done by trained personnel and with due regard for the safe discharge of firearms and state laws governing the same. Chemical injection may be done only by trained and properly licensed persons using pharmacological agents designed for humane euthanasia. In most instances, neither the Massachusetts Department of Public Health nor the U.S. Drug Enforcement Administration will license non-medical private individuals (such as PAC Agents) to possess controlled substances and syringes. Commercially available chemicals such as acetone, ketone compounds, nicotine derivatives, neuromuscular blocking agents, and the like, as well as automobile exhaust, are not approved euthanasia agents and are not allowed for that purpose.

Sick, injured, and orphaned animals may be transferred to a licensed Wildlife Rehabilitator. These rehabilitators are licensed by the DFW and must take a written test and meet other training standards. Names and addresses of persons currently licensed as rehabilitators may be obtained from the DFW's Boston office (address and telephone number below). DFW should be contacted immediately when a person encounters a sick, injured, or dead Endangered or Threatened species, such as an eagle or peregrine falcon.

Specialized Damage Situations:

Sometimes damage may be caused by animals which cannot be lawfully controlled by a Problem Animal Control Agent, or which require the agent to obtain a special permit. Examples of these kinds of damage include that caused by migratory birds (such as Canada geese), white-tailed deer, black bear, beaver, or coyote. Migratory birds complaints should be referred to the U.S. Department of Agriculture (see below). DFW should be advised of damage caused by deer, bear, beaver, and other larger mammals. In some instances, DFW will investigate these complaints in the

field. In other situations, literature or advice may be provided so that the citizen can solve the problem himself. Although you, as a PAC Agent, will not normally address these types of damage, you should have some familiarity with them. You need to know what to look for so that you can identify the damage when called by a unknowing client, and so that you can refer the client to the proper agency for resolution of the problem.

You should have some basic understanding of the major parasites and diseases which can affect wildlife. This is necessary to protect yourself and your employees when handling sick wildlife, and so that you may caution your clients against engaging in hazardous practices. Do not, however, presume to identify an animal as having a particular disease merely on its behavior and appearance. Clinical testing in a laboratory will be needed to prove what is afflicting the animal. You should, however, know what serious diseases or parasites affect the animals you are handling, how these ailments are transmitted, and how you can protect yourself and others from those which are transmissible to humans. In particular, you should have some knowledge of rabies, distemper, mange, giardiasis, Lyme disease, and raccoon roundworm, among others.

RECOMMENDATIONS FOR FURTHER READING:

Some of these are written in a popular style, while others are highly technical. Some are in-print and readily available, while others may only be obtained on the out-of-print market or on interlibrary loan. Field guides and similar sources may have useful information; those references below are recommended but are not the only sources.

Animal Damage and Control and Capture Techniques:

Canadian Trappers' Federation. 1986. Canadian trappers' manual (4th ed.)
Canad. Trappers' Fed., St. Catherine's, Ontario, 326pp.

De Almeida, M.H. 1987. Nuisance furbearer damage control in urban and suburban areas. Pages 996-1006 in M. Novak et al. (eds.) Wild furbearer management and conservation in North America. Ontario Ministry of Natural Resources, Toronto, 1150pp.

Harding, J. 1979. An animal damage identification guide for Massachusetts.
Mass. Coop. Extension Service, Univ. Mass., Amherst, Publ. SP-113, 118pp.

Hawthorne, D.W. 1980. Wildlife damage and control techniques. Pages 411-439 in S.D. Schemnitz (ed.) Wildlife management techniques manual (4th ed.). The Wildlife Society, Inc., Wash., D.C., 686pp.

Timm, R.M., ed. 1983. Prevention and control of wildlife damage. Great Plains Agricultural Council Wildlife Resources Committee and Nebraska Cooperative Extension Service, Univ. Nebraska, Lincoln, variously paged.

Also useful are the "Proceedings" of the Eastern Wildlife Damage Control Conferences (1st, 1983; 2nd, 1985; 3rd, 1987; 4th, 1989; 5th, 199x). You can have your librarian check for these on loan.

Life Histories:

Bull, J. 1974. Birds of New York state. Doubleday/Natural History Press, New York, 655pp.

Chapman, J.A. and G.A. Feldhamer, eds. 1982. Wild mammals of North America. Biology, management, economics. Johns Hopkins Press, Baltimore, 1147pp.

DeGraaf, R.M. and D.D. Rudis. 1983. Amphibians and reptiles of New England. Habits and natural history. Univ. Mass. Press, Amherst, 83pp.

Godin, A.J. 1977. Wild mammals of New England. Johns Hopkins Press, Baltimore, Md., 304pp.

Novak, M., J.A. Baker, M.E. Obbard and B. Malloch. 1987. Wild furbearer management and conservation in North America. Ontario Ministry of Natural Resources, Toronto, 1150pp.

Terres, J.K., ed. 1982. The Audubon Society encyclopedia of North American birds. A.A. Knopf, New York, 1109pp.

Animal Diseases:

Davidson, W.R. and V.F. Nettles. 1988. Field manual of wildlife diseases in the southeastern United States. Southeastern Cooperative Wildlife Disease Study, Athens, Ga., 309pp.

Davis, J.W. and R.C. Anderson, eds. 1971. Parasitic diseases of wild mammals. Iowa State Univ. Press, Ames, 364pp.

Davis, J.W., R.C. Anderson, L. Karstad, and D.O. Trainer, eds. 1972. Infectious and parasitic diseases of wild birds. Iowa State Univ. Press, Ames, 344pp.

Davis, J.W., L.H. Karstad and D.O. Trainer, eds. 1981. Infectious diseases of wild mammals (2nd ed.) Iowa State Univ. Press, Ames, 446pp.

Friend, M., ed. 1987. Field guide to wildlife diseases. General field procedures and diseases of migratory birds. U.S. Fish and Wildl. Service, Wash., D.C., Resource Publ. 167, 225pp.

Remarks:

This handbook only contains a brief summary of information necessary and useful to the Problem Animal Control Agent. If you have questions or comments, please direct them to DFW. Issuance of permits is handled through the Permit Section, Division of Fisheries and Wildlife, 100 Cambridge Street, Leverett Saltonstall Building, Boston, MA 02202 (617-727-3151). Technical questions should be directed to the Division of Fisheries and Wildlife, Field Headquarters, 1 Rabbit Hill Road, Westborough, MA 01581 (508-366-4479, 508-792-7270). The addresses and telephone numbers of DFW's five District offices can be found in the pamphlet "Abstracts of the Fish and Wildlife Laws", published annually and available from the DFW or from city and town clerks. You should obtain a copy of these and be familiar with any restrictions or prohibitions which may be mentioned. The laws governing fisheries and wildlife are contained in the Massachusetts General Laws, Chapter 131, which can generally be found at your city or town hall or library. Fisheries and wildlife regulations are contained in the Code of Massachusetts Regulations, 321 CMR. A copy may be obtained at the State House Bookstore, Boston, or contact your local library. Be aware that regulations change frequently!

Other Agencies:

Enforcement of the Fisheries and Wildlife laws and other Massachusetts environmental laws is handled by the Division of Law Enforcement (Environmental Police). Their main office is at 100 Nashua Street, Boston (617-

727-3905), with the Inland regional office in Lancaster (508-792-7436) and the Coastal regional office in Hingham (617-727-0882). In emergencies, the Radio Room of the Division of Law Enforcement can be contacted toll-free (1-800-632-8075). Federal environmental laws are enforced by the U.S. Fish and Wildlife Service (Law Enforcement Division), Federal Office Bldg., 10 Causeway Street, Boston 02222 (617-565-6580).

Migratory birds are subject to Federal law and international treaty and state law regarding them is secondary. Migratory bird permits are administered by the U.S. Fish and Wildlife Service, 300 Westgate Drive, Hadley 01035 (413-253-8509). Damage caused by migratory birds is investigated by the U.S. Department of Agriculture, APHIS/Animal Damage Control, 463 West Street, Amherst 01002 (413-253-2403). It is not lawful to harm or kill any migratory birds which are causing damage, including birds of prey, gulls, waterfowl, and others without a special depredation permit. However, such a permit is not required merely to scare or frighten such depredating birds (except endangered species).

Licensing by the Massachusetts Pesticide Board does not convey authority to engage in the control of wild vertebrate animals. The house mouse and Norway rat in commensal situations are not considered "wild". Permits from DFW are required in order to use toxicants for the control of pigeons, starlings, orchard voles, and similar species.

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11. Issuance of permits to expose poisons for the control of mammal and bird species not protected by Federal or state statutes (321 CMR 2.10).
12. Artificial propagation and maintenance of birds, mammals, reptiles, and amphibians (extract only--abandoned applications) 321 CMR 2.12(8).
13. Problem animal control (321 CMR 2.14).
14. State list of endangered wildlife and wild plants (321 CMR 10.60(4)). (extract--vertebrate wildlife only).

Leaflets and Brochures:

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MASSACHUSETTS GENERAL LAWS
CHAPTER 111, SECTION 174A.

111:174A.. Prevention of defilement of domestic water supply by gulls or terns.

Section 174A. In order to preserve the purity and prevent the pollution of the waters of any reservoir, pond, and stream used for domestic water supply, by the watershed system of the division of watershed management of the metropolitan district commission, or by a town, water supply or fire and water district, public institution or water company, said division, the public board or commission, or the governing board in case of a water company, having control of such waters may authorize one or more of its employees, so far as permissible under federal law, to take such reasonable means and use such appliances and weapons as, in the judgment of such public board or commission, or governing board, as the case may be, will prevent the defilement of said waters by gulls or terns, any provision of chapter one hundred and thirty-one to the contrary notwithstanding. Every such division, public board or commission and governing board shall keep an accurate account of all birds killed by its employees under authority of this section and submit such account to the director of the division of fisheries and wildlife of the department of fisheries, wildlife and recreational vehicles at such times and covering such periods as he may prescribe.

Source: 1988 GLM, volume 6, page 735.

MASSACHUSETTS GENERAL LAWS
CHAPTER 128, SECTION 8A

128:8A. Destruction or control of foxes and rodents; investigations; cooperative arrangements with United States.

Section 8A. In order to protect the food supplies, agricultural produce, growing crops, live stock, manufactured goods and buildings, and to safeguard the public health, the commissioner may investigate the life and habits of, and may take necessary measures to destroy or to control, foxes, and rats, mice, woodchucks, and such other rodents not protected by law, as may from time to time be determined by him to be detrimental to one or more of such purposes. In performing such duties he may, by himself or by his authorized agent, with the consent of the owner or tenant, enter upon private premises for any of such purposes at any reasonable time. In order to carry out this section, the commissioner may enter into cooperative arrangements with the United States or any agency thereof, with any department, board or commission of this commonwealth or any political subdivision thereof, or with any association, corporation or individual owning, occupying or possessing any property within the commonwealth. Section forty-three of chapter one hundred and thirty-one shall not apply to the destruction of rodents under this section. Nothing herein shall be construed to authorize the destruction or control of foxes by the use of poison.

Source: 1988 GLM, volume 7, pages 762-763.

MASSACHUSETTS GENERAL LAWS
CHAPTER 131, SECTION 37

131:37. Killing of game by owner or tenant of land; reports.

Section 37. An owner or tenant of land or, if authorized by such owner or tenant, any member of his immediate family or person permanently employed thereon, may, upon such land:--

(1) kill or attempt to kill, by means other than poisoning or trapping, any wild bird damaging his property, including domesticated animals, poultry and game on game-rearing farms or preserves, provided that such killing is not contrary to any federal law, rule or regulation.

(2) hunt or take by other means, except by poison or snare, any mammal which he finds damaging his property except grass growing on uncultivated land. No such owner or tenant shall authorize any person, other than a member of his immediate family or a person permanently employed by him, to place traps for the protection of said property other than during the open season, unless such owner or tenant has first obtained from the director a permit authorizing him to do so, which permit the director is hereby authorized to issue in his discretion, unless such authorized person holds a trapping license. All deer so killed shall be turned over to any environmental police officer and shall be disposed of by the director of law enforcement.

The following written reports shall be sent to the director by such owner or tenant acting under authority of this section:--(a) upon the taking of pheasant, ruffed grouse, hares or rabbits, or the wounding or killing of a deer, a report stating the time and place, kind and number of birds or mammals so taken, wounded or killed, within twenty-four hours of such taking, wounding, or killing; (b) upon the taking of any other birds or mammals, a report on or before January thirty-first of each year, stating the number and kinds of birds or mammals taken under authority of this section during the previous year. This section shall not be construed to limit any other provisions of this chapter.

Source: 1988 GLM, volume 8, pages 41-42.

MASSACHUSETTS GENERAL LAWS
CHAPTER 131, SECTION 38

131:38. Farmers; permit to trap and kill birds.

Section 38. Notwithstanding any other provision of law, the director may, upon application of a farmer, as defined in section one A of chapter one hundred and twenty-eight, grant a permit to trap live, and thereafter destroy, birds that are destroying agricultural crops or endangering the health of livestock, poultry or fur bearing animals. Each applicant shall state the type of trap to be used, the location of each such trap and the period within which he intends to use such trap, and such other information as the director may deem necessary. Each application shall be accompanied by a fee, the amount of which shall be determined annually by the commissioner of administration under the provision of section three B of chapter seven for the filing thereof. The farmer shall mark each trap with his name and address and the number of the permit issued to him by the director, and the farmer or his agent shall check each such trap twice daily. The director shall issue rules and regulations relative to the type of traps and kinds of birds which may be trapped, and such other rules and regulations as he may deem necessary for the protection of song and game birds. The director and his agents may, for the purpose of inspecting such traps, enter upon and pass through or over private lands and property whether or not covered by water.

Source: 1988 GLM, volume 8, page 42.

MASSACHUSETTS GENERAL LAWS
CHAPTER 131, SECTION 43

131:43. Poisons.

Section 43. A person shall not place poison in any form whatsoever for the purpose of killing any mammal or bird except pursuant to a permit issued under the provisions of this section; provided, that this section shall not prohibit any person from placing in his orchard or in or near his dwelling house, barn or other buildings poison for the purpose of destroying rats, woodchucks or other pests of like nature, or from placing with like intent under the surface of his lands carbon disulphide in any of its forms or any other poison applied in a manner similar to that in which carbon disulphide is applied. The director is hereby authorized to make rules and regulations and, pursuant to the terms thereof, to issue permits to the owners or agents of forest plantations or orchards to place poison for the extermination of rats, mice and other pests of like nature therein and to employees of municipal, state and federal governments and to others found by the director to be qualified persons to place poison elsewhere, for the control of animals and birds, in connection with public health, wood tick suppression and control, propagation and protection of wild birds and mammals, and purposes of a similar nature, or to place poison within an area specified in such permit for the purpose of killing birds which may lawfully be killed under federal and state law and which are present in such area in such numbers as in the opinion of the director to constitute a public nuisance or endanger health or safety. Possession of the raw fur of any mammal or the dead body of any bird killed by poison, except rats, mice, woodchucks or other pests of like nature, shall be prima facie evidence that the person having such possession has violated this section unless he is an employee of the federal government or an employee of the commonwealth or a political subdivision thereof to whom a permit has been issued under the provisions of this section.

Source: 1988 GLM, volume 8, pages 60-61.

See Also: M.G.L. c. 132B, "Massachusetts Pesticide Control Act".

MASSACHUSETTS GENERAL LAWS
CHAPTER 131, SECTION 80

131:80. Registration and identification of traps.

Section 80. A person shall not place, set, maintain, possess, or tend on the land of another, any trap, unless the same is registered in accordance with the provisions of this section. For the purpose of providing for the registration and identification of traps, the director shall provide application forms, renewal forms, registration certificates and other forms necessary for the registration of traps as hereinafter provided. The director shall require the applicant for registration or renewal to supply necessary information and shall charge a fee for the original certificate, which shall be valid for two years unless suspended or revoked, and a fee for a renewal for a similar period of time, the amounts of which shall be determined annually by the commissioner of administration under the provision of section three B of chapter seven, which shall cover and apply to all traps then and thereafter owned by the applicant. The director shall provide by regulation, approved by the fisheries and wildlife board, that the registration number of any certificate issued by him and the name of the owner of a trap be affixed to each trap. Upon the sale of any registered trap, the owner and purchaser shall send a joint notice of such transfer to the director, and thereupon the seller's registered number, as appearing upon each trap so transferred, shall have the letter "T" added to it to indicate that said transfer has been so registered with the director, and in addition the buyer's registration number shall forthwith be stamped upon each trap. Upon the request of two or more persons, stating that they have entered into a partnership and are willing that all members of the partnership shall trap with the registered traps of any partner, each member of the partnership shall be furnished by the director with a special certification, written upon his registration certificate, that he is authorized to use traps belonging to the other members thereof, and it shall be unnecessary for any trap used by such partnership to bear any registration number other than that of its owner. The director shall from time to time furnish to the director of law enforcement a list of all holders of registration certificates issued hereunder, including the registration number assigned to each such holder.

Source: 1988 GLM, volume 8, pages 73-74.

See Also: Code of Massachusetts Regulations, 321 CMR 3.02(5), "Hunting and Trapping of Certain Mammals".

MASSACHUSETTS GENERAL LAWS
CHAPTER 131, SECTION 80A

131:80A. Certain traps or other devices prohibited; exception; special permits; rules and regulations; penalties.

Section 80A. No person shall use, set, place or maintain any steel jaw leghold trap on land for the capture of fur-bearing mammals except in or under buildings owned, leased or rented by him. The steel jaw leghold trap may be used for the capture of fur-bearing mammals in water only if set in such a manner that all reasonable care is taken to insure that the mammal dies by drowning in a minimum length of time. No other device which is set in such a manner that it will knowingly cause continued suffering to such a mammal caught therein, or which is not designed to kill such a mammal at once or take it alive unhurt shall be used, set, placed or maintained for the capture of fur-bearing mammals; provided, however, that a person or his duly authorized agent may apply to the director for a special permit to use such traps, other than the steel jaw leghold trap, on property owned by such person. Issuance of such special permits shall be governed by rules and regulations adopted by the director pursuant to chapter thirty A. Such rules and regulations shall include, but not be limited to provisions relative to the following:--

(1) The applicant or his agent shall apply to the director in writing and shall state that there exists on his property an animal problem which cannot reasonably be abated by the use of traps other than those prohibited by this section, not including the steel jaw leghold trap. If the director determines that such an animal problem exists which cannot reasonably be abated by the use of traps other than those prohibited by this section, not including the steel jaw leghold trap, he may authorize for a period not exceeding ninety days the use, setting, placing or maintenance of such traps during which time the procedures for obtaining a special permit, as set forth in the rules and regulations adopted pursuant to this section, shall be complied with.

Whoever violates any provision of this section, or of any rule or regulation made under the authority thereof, shall be punished by a fine of not less than fifty nor more than one hundred dollars, or by imprisonment for not more than thirty days, or by both such fine and imprisonment.

Source: 1988 GLM, volume 8, pages 74-75.

MASSACHUSETTS GENERAL LAWS
CHAPTER 131, SECTION 83

131:83. Sparrows and starlings.

Section 83. Officers in charge of public buildings in cities and such officers as the selectmen designate and appoint in towns may take such reasonable means and use such appliances, except poison, as in their judgment will effectively exterminate English sparrows and starlings in such cities and towns, but nothing herein shall authorize an officer to enter on private property without the consent of the owner or occupant thereof. A person shall not willfully resist such officers while engaged in such duties or knowingly interfere with the means used by them for such purpose.

Source: 1988 GLM, volume 8, page 76.

MASSACHUSETTS GENERAL LAWS
CHAPTER 270, SECTION 3A

270:3A. Placing poison for rodents where it may cause injury; enforcement officers.

Section 3A. Whoever negligently or maliciously places any poison or poisoned food for the control of rats, mice or other rodents in any place where it may cause injury to any human being or domestic animal shall be punished by a fine of twenty-five dollars. The officers charged with the enforcement of the laws relating to fish, birds and mammals under chapter one hundred and thirty-one shall take cognizance of violations of this section and enforce the provisions thereof, and they shall have all powers necessary therefor.

Source: 1988 GLM, volume 12, page 627.

321 CMR: DIVISION OF FISHERIES AND WILDLIFE.

321 CMR 2.00: MISCELLANEOUS REGULATIONS PERTAINING TO FISHERIES AND WILDLIFE.

2.09. Trapping of Birds by Farmers.

- (1) Permits may be issued to farmers to trap alive and subsequently destroy English (house) sparrows, pigeons, and starlings if they are destroying agricultural crops or endangering the health of livestock, poultry, or fur-bearing animals. In addition to the birds listed above, a permit may be issued to trap and subsequently destroy federally protected migratory birds, provided that a federal permit has been obtained by the applicant and countersigned by the director.
- (2) If any bird protected by state or federal law, other than birds specified in the permit, be trapped, permittee shall immediately release it unharmed.
- (3) Applications for permits shall be in writing, and shall state: the damage being done, the extent of such damage, the species of birds to be trapped, the type of trap to be used, the location of each such trap, and the period within which he intends to use such trap(s). Each application shall be accompanied by a fee, the amount of which shall be determined annually by the Commissioner of Administration and Finance pursuant to G.L. c. 7, s. 3B.
- (4) No trap other than a New York Starling Trap or trap of similar design shall be used in conjunction with this permit.
- (5) Each trap shall be marked with the permittee's name and address and his permit number. The permittee or his agent shall check each such trap twice daily.
- (6) Permittees must comply with any special terms, conditions, or restrictions prescribed in the permit.
- (7) Unprotected birds trapped under this permit shall be destroyed as soon as possible after trapping, and shall not be kept for food or other purpose.
- (8) At the end of the period specified in the permit, permittee shall send the director a written report, signed by him, stating the number and species of birds trapped and destroyed.
- (9) This permit may be suspended or revoked by the director for cause after due notice and hearing.

Source: Code of Mass. Regulations, 321 CMR, page 8.2, dated 9-29-89, as amended in 1994.

Regulatory Authority: M.G.L. c. 131, s. 38.

321 CMR: DIVISION OF FISHERIES AND WILDLIFE.

321 CMR 2.00: MISCELLANEOUS REGULATIONS RELATING TO
FISHERIES AND WILDLIFE.

2.10: Issuance of Permits to Expose Poisons for the Control of Mammal and Bird
Species Not Protected by Federal or State Statutes.

(1) Definitions:

(a) Director. The Director of the Massachusetts Division of Fisheries and Wildlife.

(b) Board. Division of Fisheries and Wildlife Board.

(2) Exposing of Poisons. No poisons shall be exposed for the purpose set forth above except as provided for in these rules and regulations.

(3) Permits: To whom issued.

(a) Permits may be issued to the owner or agents of forest plantations or orchards to place poison for the extirmination of rats, mice, and other pests of like nature, upon written request stating the specific area involved, toxicant, bait, and period of time during which such work will be conducted.

(b) For the purposes stated in this Act, permits may be issued to agents of the Fish and Wildlife Service, U.S. Department of the Interior, and to agents of the Animal and Plant Health Inspection Service, U.S. Department of Agriculture.

(c) For the purposes of this Act, permits may also be issued to commercial pest control operators, employees of state agencies, or employees of political subdivisions of the Commonwealth.

(d) All persons must be certified by the Massachusetts Pesticide Board either as a private applicator in case of persons described in 321 CMR 2.10(3)(a), or a commercial applicator in 321 CMR 2.10(7), subcategory vertebrate in the case of persons described in 321 CMR 2.10(3)(c).

(e) A person holding a permit issued under these rules and regulations must be in direct and constant charge of any applications made under such a permit and must adhere to all rules and regulations of the Massachusetts Pesticide Board.

(4) Permits: Duration and Time Limits of Permits. Permits shall allow exposure of poison for the control of birds only for the period specified therein: which period or any part thereof may not be prior to November 15, nor subsequent to the following March 15; except that, the Director may authorize the placement of certain poisons on specific bait materials in

specific situations provided that in his judgement sufficient scientific evidence has been presented to show that such placement will not be hazardous to migratory birds or other wildlife. All permits may be revoked for cause at any time by the Director.

(5) Materials Which May be Used Under Permits.

(a) All materials used under these permits must be registered with the Division of Food and Drugs, Massachusetts Department of Public Health.

(b) Only such materials as may be approved by the Director may be used under these permits.

(c) The use of all materials approved under 321 CMR 2.10(5)(b) above must be in conformance with any instructions therefor issued by the manufacturer thereof and with any added restrictions, conditions, or standards which may be placed on such use by the Director in order to protect migratory birds or other components of the environment.

(6) Notification and Reporting of Operations.

(a) All persons holding permits shall notify the Director of each application in writing prior to the application, indicating date and place of application.

(b) Within one month following each operation, the person holding the permit under which the work is done shall report in summary form to the Director:

1. Location of operation
2. Dates of operation
3. Material exposed
4. Amount of material exposed
5. Evaluation of the results of the operation
6. Safety measures and precautions instituted

(c) In the case of municipal operations, permit holders shall notify all proper authorities including Selectmen or Mayors, local public health officials, and local police.

(7) Policing of Operation.

(a) Permittee shall make every effort to collect and dispose of all dead mammals or birds killed under the permit.

(b) Permittee shall remove all bait and toxicants from the area immediately upon completion of the operation.

(8) Proof of Financial Responsibility.

(a) Private operators holding permits must produce evidence of comprehensive insurance in the amount of or in excess of \$25,000- \$50,000 for public liability and \$5000 for property damage.

(b) In the issuance of a permit under the above Chapter and Section, the Commonwealth, Director, or the Board assume no liability of any name or nature.

Source: Code of Massachusetts Regulations, 321 CMR, pages 8.1-9, as most recently compiled on 12-31-86, and as most recently amended in the Massachusetts Register, issue #579 (3-18-88).

Regulatory Authority: M.G.L. c. 131, s. 43.

321 CMR 2.12

Rules and Regulations relative to the Artificial Propagation of Birds, Mammals, Reptiles, and Amphibians

(8) Abandoned Applications. Upon receipt of an incomplete application, an improperly executed application, or an insufficient fee, the applicant shall be notified of the deficiency. If the applicant fails to supply the requested information, pay the required fee or otherwise fails to correct the deficiency within sixty (60) days following the date of notification, the application shall be considered abandoned and shall be returned to the applicant.

Extracted from: Code of Massachusetts Regulations, 321 CMR, pages 9-16, as most recently compiled on 12-31-86, and as amended in the Massachusetts Register, issue #562, dated 8-7-87.

Regulatory Authority: M.G.L. c. 131, s. 23.

321 CMR 10.00: MASSACHUSETTS ENDANGERED SPECIES ACT
REGULATIONS.

10.60(4): List of Endangered, Threatened, and Special Concern Species.

[Extract-- Vertebrates only]

FISH:

T	American Brook Lamprey	<u>Lampetra appendix</u>
E	Shortnose Sturgeon	<u>Acipenser brevirostrum</u>
E	Atlantic Sturgeon	<u>Acipenser oxyrinchus</u>
E	Lake Chub	<u>Couesius plumbeus</u>
SC	Eastern Silvery Minnow	<u>Hybognathus regius</u>
E	Northern Redbelly Dace	<u>Phoxinus eos</u>
SC	Longnose Sucker	<u>Catostomus catostomus</u>
SC	Burbot	<u>Lota lota</u>
T	Threespine Stickleback (trimorphic freshwater population only)	<u>Gasterosteus aculeatus</u>

AMPHIBIANS:

SC	Jefferson Salamander (including triploid and other polyploid forms within the <u>Ambystoma jeffersonianum/Ambystoma laterale complex</u>)	<u>Ambystoma jeffersonianum</u>
SC	Blue-spotted Salamander (including triploid and other polyploid forms within the <u>Ambystoma jeffersonianum/Ambystoma laterale complex</u>)	<u>Ambystoma laterale</u>
T	Marbled Salamander	<u>Ambystoma opacum</u>
SC	Spring Salamander	<u>Gyrinophilus porphyriticus</u>
SC	Four-toed Salamander	<u>Hemidactylium scutatum</u>
T	Eastern Spadefoot	<u>Scaphiopus holbrookii</u>

REPTILES:

SC	Spotted Turtle	<u>Clemmys guttata</u>
SC	Wood Turtle	<u>Clemmys insculpta</u>
E	Bog Turtle	<u>Clemmys muhlenbergii</u>
T	Blanding's Turtle	<u>Emydoidea blandingii</u>
T	Diamondback Terrapin	<u>Malaclemmys terrapin</u>

E Plymouth Redbelly Turtle
 SC Eastern Box Turtle
 T Loggerhead
 T Green Turtle
 E Hawksbill
 E Atlantic Ridley
 E Leatherback
 T Worm Snake
 E Black Rat Snake
 E Copperhead
 E Timber Rattlesnake

Pseudemys rubriventris bangsi
Terrapene carolina
Caretta caretta
Chelonia mydas
Eretmochelys imbricata
Lepidochelys kempi
Dermochelys coriacea
Carphophis amoenus
Elaphe obsoleta
Agkistrodon contortrix
Crotalus horridus

BIRDS:

SC Common Loon
 T Pied-billed Grebe
 E Leach's Storm-petrel
 SC American Bittern
 T Least Bittern
 SC Cooper's Hawk
 SC Sharp-shinned Hawk
 T Northern Harrier
 E Bald Eagle
 E Peregrine Falcon
 SC Common Moorhen
 T King Rail
 T Piping Plover
 E Upland Sandpiper
 E Eskimo Curlew
 SC Least Tern
 E Roseate Tern
 SC Common Tern
 SC Arctic Tern
 SC Common Barn-owl
 E Short-eared Owl
 SC Long-eared Owl
 E Sedge Wren
 E Loggerhead Shrike
 E Henslow's Sparrow
 SC Grasshopper Sparrow
 T Northern Parula

Gavia immer
Podilymbus podiceps
Oceanodroma leucorhoa
Botaurus lentiginosus
Ixobrychus exilis
Accipiter cooperii
Accipiter striatus
Circus cyaneus
Haliaeetus leucocephalus
Falco peregrinus
Gallinula chloropus
Rallus elegans
Charadrius melodus
Bartramia longicauda
Numenius borealis
Sterna antillarum
Sterna dougallii
Sterna hirundo
Sterna paradisaea
Tyto alba
Asio flammeus
Asio otus
Cistothorus platensis
Lanius ludovicianus
Ammodramus henslowii
Ammodramus savannarum
Parula americana

SC Blackpoll Warbler
SC Mourning Warbler
E Golden-winged Warbler

Dendroica striata
Oporornis philadelphia
Vermivora chrysoptera

MAMMALS:

SC Rock Shrew
SC Water Shrew
SC Small-footed Myotis
E Indiana Myotis
SC Southern Bog Lemming
SC Gray Seal
E Sei Whale
E Blue Whale
E Fin Whale
E Humpback Whale
E Northern Right Whale
E Sperm Whale

Sorex dispar
Sorex palustris
Myotis leibii
Myotis sodalis
Synaptomys cooperi
Halichoerus grypus
Balaenoptera borealis
Balaenoptera musculus
Balaenoptera physalus
Megaptera novaeangliae
Balaena glacialis
Physeter catodon

Source: Code of Massachusetts Regulations, 321 CMR, pages 95-96, as published in the Massachusetts Register #679 on 1-31-92.

Regulatory Authority: M.G.L. c. 131A, s. 4.

COMMONWEALTH OF MASSACHUSETTS
DIVISION OF FISHERIES AND WILDLIFE

CONTROL OF SNAPPING TURTLES

Snapping turtles are large, bottom-dwelling turtles with big heads, powerful jaws, and an aggressive nature. Adults may average 8-12 inches in length (sometimes larger) and weigh 10-35 lbs (record weight in Massachusetts, 67 lbs). They have a long tail with saw-toothed tubercles, a heavy carapace, and a small yellowish undershell. They are found throughout most of the United States from the Great Plains eastward. These turtles prefer waters with soft muddy bottoms and an abundance of aquatic vegetation or tangled branches and debris. However, they are found in almost every type of freshwater habitat, including ponds, rivers, brooks, swamps, and creeks, and occasionally brackish tidal waters. They are largely aquatic but may occasionally bask on rocks or logs. They may also travel some distance overland. Snappers spend most of their time on the bottom of a pool or buried in mud with only eyes and nostrils exposed. They may be active at night, creeping slowly over the bottom. Most snapping turtles enter hibernation by late October, burying themselves in the mud, and emerging in March-May depending on the area. Nesting occurs from late May through September, peaking in June. There are normally 20-30 eggs per clutch, although numbers may vary. Nest emergence is usually late August to early October. Snappers are omnivorous, feeding on insects, molluscs, crustaceans, worms, fish, amphibians, snakes, small turtles, birds, mammals, carrion and garbage. They will also eat various water plants. These turtles are powerful and can strike very rapidly, with their thrust often carrying the front of the body off the ground. Due to their feeding habits, snapping turtles are prone to accumulate toxicants, such as PCB's, in their body tissues.

Damage: In general, these turtles are seldom harmful to wildlife except in certain confined areas such as waterfowl sanctuaries and fish hatcheries. The indiscriminate destruction of snapping turtles as pests is discouraged and local populations should not be exterminated. These turtles also act as scavengers and clean up debris and detritus which is found in the various water bodies.

Hand Capture: In some instances, these turtles may be crossing a roadway or a yard where they may be run over or where children may encounter them and be bitten. The turtle should then be moved across the road or out of the open area. Grasp the turtle by the hind legs, keeping the belly toward you and the head away, and pick it

up or drag it. Do not lift large snappers by the tail as their weight may cause separation of the tail vertebrae.

Shooting: Where it is safe and lawful to do so, basking snapping turtles may be shot with a .22 caliber rifle. Do not shoot turtles in the water or on a flat rock as the projectile may ricochet. Snappers are also tenacious of life and may crawl into the water and escape even if fatally wounded.

Trapping: The most effective means of removing turtles from a water body is by using turtle traps, either of commercial manufacture or home-made. The barrel-shaped traps (see attached) are generally 4 to 6 feet long, using 3-inch square mesh of #24 linen twine, or the equivalent coarse mesh poultry wire. If constructed of twine, it should be treated with a non-toxic preservative. Three to five hoops per trap, 30 inches in diameter, of wood or 6-gauge steel wire, are sufficient. The funnel-shaped entrance should be 18 inches deep from front hoop to the opening. The funnel mouth is 1 inch by 20 inches, with the corners of the opening tied to the middle hoop. The rear end is closed off, or another funnel may be attached. Stretchers of wood or wire are attached to the side to keep the trap extended.

The trap must be set with the tops of the hoops just out of water so that the turtles may obtain air and breathe. All other turtles than snapping turtles are protected and must be released alive and unhurt. Basking-type traps, where the turtle climbs a ramp which tips and drops them into a holding pen, may also be used but are generally ineffective for snappers, which bask infrequently.

Hoop traps for snapping turtles should be baited with fish, fish heads, chicken entrails, or similar juicy animal remains. The bait should be fresh since snappers may not always be attracted by spoiled bait. The traps should be visited daily and all turtles removed and non-target animals released. Be sure that the trap is set in such a manner that changing water levels do not submerge it and drown the turtles.

Adapted from a leaflet originally prepared by the U.S. Fish and Wildlife Service (1965).

FIGURE 1 - HOOP NET TURTLE TRAP

COMMONWEALTH OF MASSACHUSETTS
DIVISION OF FISHERIES AND WILDLIFE

CONTROL OF ENGLISH SPARROWS

The English or house sparrow, an exotic bird introduced from Europe in the 1800's, has adapted itself to life throughout the United States and Canada. They actually belong to the weaver finch family, although they are commonly called "sparrows". Although their activities are mainly beneficial, they have several habits that are objectionable to humans and they need occasional control to protect human health and property. They also compete for nesting space with several native birds. To selectively control English sparrows, it is necessary to understand their behavior and to distinguish them from native sparrows, which are protected by law.

Life History and Habits: English sparrows prefer openings or hollows for nesting and will use any sort of a nesting box, cavity or opening in buildings. Normally, nest building and egg laying begins in early spring-- March and April in the northern United States and somewhat earlier in the south. A clutch normally consists of four to eight evenly speckled eggs that hatch in 13-14 days. They produce several broods each season and use the same nesting hole over and over again. Generally, these sparrows are gregarious. They nest, roost, and feed together in large flocks.

The English sparrow, like our own sparrows and finches, is primarily a seed eater and supplements its diet with insects. It is one of a few birds which will eat the Japanese beetle.

Eliminating Nests and Roosts: English sparrow populations can be greatly reduced by destroying nests and eggs at two week intervals during the spring and summer. A long pole with a hook fastened to one end can be used to tear down nests under eaves, rafters, and similar places. The elimination of nesting and roosting sites may be the best permanent solution to the problem. To prevent a recurring infestation, it may be necessary to remove all or part of the vines from certain buildings. Copings and ledges of some buildings may be blocked with wood or sheet metal strips placed at an angle to eliminate the roosting space.

Screening: Steeples, towers, poultry houses, barn lofts, and similar places should be bird-proofed with 3/4-inch or smaller mesh wire or poultry netting.

Shooting: Although it should be used with caution and with due regard for state laws regarding the discharge of firearms, shooting with low powered guns is selective and will eliminate infestations, if persistently used. Where permissible, shooting with .22 caliber bird shot (#12) is effective.

Scaring Devices: Most of the devices commonly used for frightening birds-- such as scarecrows, plastic owls, and the like-- are only temporarily useful against English sparrows, except where they are roosting in trees.

Trapping: Local control of English sparrows can be accomplished by trapping and presents no danger to protected species. To lure birds to a trap, use poultry scratch feed, fine cracked corn, grain sorghum, wheat, bread crumbs or combinations of these. Bait several locations even though only one trap is used. Since some untrapped birds associate unpleasantness with a particular area, move the trap to another baited area when results at the first site diminish. The best trap sites are generally near low shrubs or hedges. The trap should be covered with 3/4-inch mesh wire, since some birds can escape through a larger mesh. Leave one or two birds in the trap as decoys. Larger numbers tend to flutter wildly and scare other birds away. Various ready-made live traps are on the market. Others can be easily fabricated.

Sieve-Type Trap: This simple trap requires close attention for good results. A sieve-like box with short sides is balanced on an upright stick with a string attached. A pull on the string lets the box fall over the birds attracted to bait underneath. While the dimensions can vary, the box should be narrow enough so that a person can reach inside to take out the captured sparrows. The trap should not be raised more than six inches above ground. If it is higher, sparrows can escape as the box is falling.

Funnel Trap: This trap is more difficult to build. It is constructed of wire mesh and consists of a large rectangle with two funnels, one at the entrance and another inside the box. The birds enter the first funnel at its apex and go inside the box. Stiff wires at the tip of the funnel's cone discourage sparrows from backing out. They then enter the second funnel and pass into a second compartment, from which escape is unlikely. A door is necessary for trappers to remove the birds.

Nest Box Trap: This trap resembles a bird nest box. Upon entering the trap, the weight of the bird operates a mechanism which, in turn, drops the bird into a bag

and resets the trap for another. Collecting bags should be tightly woven. The front wall of the box should be the last put into place. Screw it down so that it can be easily removed for repair and renovation. Glue pieces of hair and feathers to the rear of the tipping chamber. Fasten the trap to a post or side of a building so that the collecting sack hangs free and is easily accessible.

Center Drop Trap: This is one of the simplest and best traps to use. Birds drop through openings in the center and cannot fly out. Build the trap 6 feet wide by 6 feet high by 9 feet long. Use 2x2-inch material with 1x2-inch or 1x4-inch for cross braces and the door. Cover the trap with 3/4-inch mesh wire. Make the entrance frame 1-1/2 feet wide with 2-inch mesh wire openings.

Adapted from a leaflet originally prepared by the U.S. Fish and Wildlife Service (1974). Rough designs of the live traps described above can be obtained from the Mass. Division of Fisheries and Wildlife.

COMMONWEALTH OF MASSACHUSETTS
DIVISION OF FISHERIES AND WILDLIFE

CONTROL OF STARLINGS

Large-scale trapping of nuisance starlings is generally impractical. However, the trapping method offers considerable promise in dealing with orchards, backyards, small feedlots, and newly-invaded areas.

The best livetrapp devised so far is a modification of the Australian crow trap (similar to the New York starling trap). This trap has an opening in the bottom of a "V" formed on the top of the trap. Birds drop in through this opening to take the bait. On attempting to fly out, they go up into the ends of the "V" rather than back out through the throat of the trap, where they entered. Refer to the attached diagram and "bill of materials". Traps should be made as large as practical, at least five or six feet high, six feet wide, and eight feet long. If the sections are bolted together it will be easier to take them apart when necessary to move them.

Do not place traps under trees. Place them in the open where the bait and decoy birds can be easily seen by other starlings. Almost any food which the starlings are used to can be used as bait. Culled apples, dried fruit, raisins, stale French-fried potatoes, canned or cracked corn, pelleted animal feed, silage, beet pulp meal, linseed oil meal, and even meat scraps have all been effective when the birds have had prior experience feeding on them.

Keep the traps well supplied with bait and water. An inexpensive watering trough can be made by splitting an old automobile tire down the middle.

Best results are obtained when ten to twelve starlings are left in the trap to serve as decoys. It may be necessary to "salt" the trap by catching the original decoys through other means before the starlings will enter the large trap. The trap should be tended at regular intervals and all of the birds, except the decoys, removed. If a large number of birds is caught it is best to remove ten or twelve decoy birds first and hold them in a small cage. These birds will be needed when the trap is once again in operation. Then, remove the majority of the birds for disposal.

Trap location is important-- if the trap is not attracting starlings, move it to another location (or try another bait). All birds caught except starlings, English sparrows, and vagrant pigeons must be released unharmed.

Farmers should refer to M.G.L. c. 131, s. 38, and 321 CMR 2.09 for permits to trap other blackbirds damaging agricultural crops. Under specialized circumstances, persons properly licensed by the Massachusetts Pesticide Board may obtain a permit for chemical control of starlings. Refer to M.G.L. c. 131, s. 43, 321 CMR 2.10, and the Massachusetts Pesticide Control Act (M.G.L. c. 132B). Unlicensed and improperly trained persons may not use chemicals for controlling starlings or other birds or mammals.

Adapted from a leaflet originally prepared by the U.S. Fish and Wildlife Service (1977).

BILL OF MATERIALS

- 15 - 1" X 4" X 8' 2 HINGES
- 25 - 1" X 4" X 6' 2 1B. STAPLES
- 4 - 1" X 1" X 8'
- 1 - 1/2" X 16" X 8' EXTERIOR PLYWOOD
- 40' X 6' - 1" MESH CHICKEN WIRE

TOP PANEL (MAKE TWO)

SIDE PANEL (MAKE TWO)

CUT WIRES AT MARKS

BEND AT CIRCLES

SUSPENDED WIRES

TRAP THROATS

NO. 1

NO. 2

30 HOLES REQUIRED

COMMONWEALTH OF MASSACHUSETTS
DIVISION OF FISHERIES AND WILDLIFE

VAGRANT PIGEON CONTROL

Pigeons Today: Pigeons similar to those now living in a semi-wild state in towns and cities have been closely associated with man since the beginning of recorded history. The form, coloration, and habits of these feral birds suggest that they were originally derived from the blue rock, or common, pigeon (*Columba livia*) of Europe, Asia, and Africa. Most flocks of pigeons in urban or rural areas are composed of free-ranging "wild" birds. However, banded birds (homing pigeons) are privately owned and should not be killed or molested. While the presence of pigeons affords pleasure to many, excessive concentrations present a health hazard and may offend people's senses.

Control Techniques

Roost Elimination: Measures to control roosting sites appear costly, but permanent methods of control are usually worthwhile in the long run. Openings in lofts, church towers, behind signs, and under eaves can be screened with rust-proof 3/4-inch mesh wire, which will also keep out starlings and English sparrows. Roosting on ledges can be eliminated by screening them with wire netting or by installing wood or metal sheathing at a steep incline.

Products such as glue, wires, or electrical devices can also be used, but these methods are usually expensive and not always effective. Somewhat more permanent products are those which utilize metal wires in the form of a bristling fence which acts as a barrier to prevent roosting.

Trapping: General Recommendations: Set traps in inconspicuous places where pigeons commonly roost or feed and where they are not apt to be vandalized. Roof tops which have water dripping from air-conditioning units are excellent summertime trapping sites.

Small traps can be used effectively, but larger walk-in types are better. They should be easy to dismantle. It is important to bait the trap with the kind of food the birds are eating. Whole corn and grain sorghum are generally good baits. Scatter a small amount outside the trap door to attract the birds. Keep a generous quantity of bait on the floor inside and near the trap door at all times. Water should also be

available in the traps. One or two decoy birds will tend to draw in others. Light-colored birds make better decoys than dark, blue-gray ones. Trapped birds should be removed frequently. Too many fluttering birds will tend to scare others away.

Loft Traps: Birds often use attics, unused upper stories in industrial buildings, deserted factories, or partially-used buildings as nesting and roosting sites. These indoor roosts can be made into productive traps by closing them up with screening or plastic. Leave one or two entrances open until the birds become accustomed to using them. Then, fit the entrances with trap doors that can be closed from the outside at night after the birds have settled down. The trapped birds can then be caught by hand or with nets.

Funnel Traps: A simple trap can easily be made from 1x2-inch welded wire with a 1-1/2-inch "V" opening. This is kept from springing shut by large nails. Pigeons are attracted to a small amount of bait scattered at the entrance. They see more bait inside the trap and force their way through the small opening.

A variation of the above can be made by having the funnel on a inclined board. Pigeons pick up bait, squeeze their way through the opening, then hop down 4 to 6 inches to the floor of the trap. This use of an inclined board tends to keep trapped birds away from the entrance. Various shapes can be utilized in making funnel traps. The lily-pad and clover-shape traps are easy to set up and peg to the ground.

Bob-Type Trap: This trap is capable of large daily catches and enables a person to enter and remove the birds through a small door constructed in the end of the trap. Although large traps are preferred, good catches have been made using poultry crates and other small enclosures.

The construction of a trap with 1x2-inch material is desirable so as to reduce the weight, which is a factor if the trap is to be moved. The use of bolts and the construction of the trap in five sections will facilitate dismantling.

The door or entrance through which pigeons are lured is the principal feature of the trap. Individual, free-swinging "bobs" are most practical and successful. These bobs can be made of heavy aluminum wire or light-weight metal rods. It is important that they swing upward and inward easily and drop back smoothly into slots at the base of the door.

Shooting: Shooting is not normally the most effective nor aesthetically pleasing way to control pigeons. Sometimes, individual birds roosting in barns or similar structures may be controlled in this fashion. Be sure to comply with state laws regarding the discharge of firearms. At ranges less than 50 feet, .22 caliber bird shot is effective and will do little or no damage to structures.

Poisoning: Poisoning should not normally be used for pigeon control. Where permitted, users must comply with provisions of M.G.L. c. 131, s. 43, 321 CMR 2.10, and the Massachusetts Pesticide Control Act (M.G.L. c. 132B).

Adapted from leaflets prepared by the U.S. Fish and Wildlife Service (1968, 1976).

NORTHERN NEW ENGLAND ANIMAL DAMAGE CONTROL PROGRAM EDUCATION LEAFLET SERIES

CANADA GOOSE (*Branta canadensis*)

BIOLOGY AND BEHAVIOR

The Canada goose is a brownish-gray bird with a long black neck, a white cheek patch, and black legs and feet. It is a large bird (weight: 7-14 lbs. [3-6 kg.]; wingspan: 5-6.5 ft. [1.5-2 m.]); among North American waterfowl, the Canada goose is second only to swans in overall size. In flight, the prominent white rump and black tail band of a Canada goose are clearly visible. The loud honking and familiar V-shaped or single-file flocks of migrating Canada geese are quickly recognized.

Throughout much of their range, Canada geese are migratory, shifting between summer breeding grounds and wintering areas on coasts, bays, large rivers, and other water systems that are free of ice. However, in many areas of New England, Canada geese are non-migratory, year-round residents living in close proximity to humans.

Canada geese feed early in the morning and again in mid-to late afternoon; between feedings, they rest, preen, or pursue other activities. Geese are "grazers", feeding primarily upon aquatic and terrestrial vegetation (tender seedlings and shoots, mature seedheads, fruits, berries) and invertebrates (insects, mollusks, crustaceans). Cultivated crops and grasses have become staple foods of many resident goose populations.

Canada geese are monogamous and maintain their pair bond for life. Should a mate die, the remaining individual will select a new mate. Females usually breed during their second year whereas some males may not acquire a mate for several years. A nest is constructed on an elevated site over or adjacent to water, such as on a muskrat house, island, or tussock. Geese also will use artificial nesting platforms. Four to ten eggs are laid during late March or April and chicks hatch about 28 days later.

ECONOMIC STATUS AND IMPORTANCE

Canada geese are prized throughout New England by waterfowl hunters, who, through purchases of hunting licenses and duck stamps, generate considerable revenue for use in conservation activities. Numbers of Canada geese have increased steadily in New England since the early 1970's, particularly in suburban areas and urban parks. As a result, complaints and reports of damage

caused by geese also have risen. Common problems with Canada geese include damage to agricultural crops or other vegetation (by consumption, uprooting, trampling), aesthetic degradation of property (accumulation and odor of droppings and feathers), reduction of water quality (nutrient enrichment and contamination with feces), and threat to personal safety (bird/airplane encounters).

CONTROL TECHNIQUES

The Canada goose is protected under the federal Migratory Bird Treaty Act. Geese may not be killed, purchased, sold, or held in possession, except as allowed under specific guidelines established by the U. S. Department of Interior and state wildlife agencies. A permit is not necessary to harass depredating geese. Nevertheless, you should consult local wildlife authorities about possible restrictions before implementing a damage control program for geese.

Preventive Measures

Do not attract wild geese or encourage them to stay by providing supplemental foods. Although many people receive personal satisfaction from feeding wild animals, foods provided are often of poor nutritional quality and do not satisfy metabolic needs of geese. Additionally, supplemental feedings (1) increase local population densities of geese (and thus increase the potential for disease transmis-

sion), (2) cause geese to lose their natural fear of humans, and (3) may repress the instinct to migrate, potentially leading to establishment of large, resident populations of geese. Farmers should consider planting crops that ripen outside the time of normal migration and coordinate the timing of their planting with other farmers in the area so that vulnerable crops ripen at the same time as ways of reducing losses to geese moving south during fall migration. Delayed planting or using plant varieties more tolerant of grazing may minimize early-season goose depredations.

Non-Lethal Controls

Harassment may prevent Canada geese from establishing a daily feeding pattern, but only if the disturbance is persistent and begins soon after the first geese arrive. Integrating several control techniques is more effective than using any single type of control alone. Frequent repositioning of scare devices appears to minimize habituation of geese to controls and increases overall effectiveness. Auditory harassment devices include fireworks, cracker shells, whistle rockets, propane cannons, or electronic noise makers. Local ordinances may prohibit use of some of these methods; consult local authorities before using noise-making devices. Visual harassment devices, such as scarecrows, helium-filled balloons, mylar reflecting tape, or colored flags, can be placed strategically about the site of depredation. Visual devices that incorporate movement are more effective than stationary objects. Physical harassment techniques recently have received renewed attention. Trained dogs can chase geese from agricultural fields before the birds establish a daily feeding routine. Motorized toy boats are used to harass geese on public water supplies and open water recreational areas. Remote control model airplanes are being tested as a means to drive geese from airports. Physical barriers, such as strands of monofilament line, strung over municipal water supplies may inhibit geese from entering, thus reducing the potential for contamination. Herd, trapping, and relocation have been used to remove isolated, small flocks of nuisance geese during the period of time they are flightless (geese lose [molt] their flight feathers in late June, July, or early August). Because this control option is labor intensive, costly, and often simply transfers the problem from one site to another, its use is usually discouraged.

Lethal Controls

In all but the most extreme cases, use of lethal measures to eliminate depredating Canada geese is prohibited. However, thinning goose populations during the hunting season may minimize the amount of damage caused by geese and re-establish a natural wariness towards humans. Preliminary results from on-going research indicate that late season extensions of the hunting season may be an effective way to reduce locally troublesome, resident goose populations without adversely affecting the migratory population.

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- Maine Department of Inland Fisheries and Wildlife
- University of Maine, Cooperative Extension
- Massachusetts Division of Fisheries and Wildlife
- University of Massachusetts, Cooperative Extension
- University of Massachusetts, Wildlife and Fisheries Biology Program
- New Hampshire Fish and Game Department
- University of New Hampshire, Cooperative Extension
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COMMONWEALTH OF MASSACHUSETTS
DIVISION OF FISHERIES AND WILDLIFE

CONTROL OF OPOSSUMS

Range and Description.

The opossum ("possum") is the only native mammal in the United States that possesses an abdominal pouch for carrying its young. It can be found in wooded areas from the Gulf of Mexico to New England and westward to Michigan, Wisconsin, Iowa, and Missouri.

The 'possum is usually light gray in color and the average adult measures about 33 inches in length, including a 12-inch tail. They produce one to three litters per year, depending on the region of the country. The young (5-13, usually) are tiny (bumblebee-sized) and poorly developed at birth. After birth, they crawl into the mother's pouch and attach to the mammary glands where they remain for four-six weeks. After leaving the pouch, the young remain with the mother for about one month before setting out on their own.

Opossums seek shelter in a hollow log, rock crevice, tree cavity, or an old squirrel leaf nest. They prefer habitats adjacent to swamps, along streams, and in wooded country. Where food is plentiful, travel may be limited to a few hundred yards from den site to feeding areas. The animals are omnivorous, eating almost anything available, including fish, crustaceans, insects, mushrooms, berries and other fruits, cultivated vegetables, eggs, carrion, and human garbage. They are sometimes detrimental to farm poultry and corn fields.

Opossums are hunted and trapped in many states for food and fur. The furs are used mostly for trimming in inexpensive garments.

Control.

"Nuisance" opossums can usually be excluded from chicken coops, pens, and similar structures by keeping openings blocked up, loose wire fastened down, and similar exclusionary measures. The animals can be kept from climbing over wire mesh fences by stretching electric fence wire near the top of the fence and three inches out from the mesh.

Opossums can also be readily caught in cage or box traps set near its denning area or near the damage site. Smelly baits such as cat or dog food, fish, or over-ripe fruit are often effective baits.

Adapted from a leaflet originally prepared by the U.S. Fish and Wildlife Service (1977).

MOLES

BIOLOGY AND BEHAVIOR

Moles live underground and inhabit the lawns of residential homes, golf courses, cemeteries, and parks, as well as unmaintained fields, forest edges, and pastures where moist, sandy loam soils are common and digging is easy. Three species of moles are present in the Northeast. The most widely distributed species in New England is the semi-aquatic star-nosed mole (*Condylura cristata*), which can be found in all six states. Two other species may be encountered; the eastern mole (*Scalopus aquaticus*), common to Massachusetts, Connecticut, and Rhode Island, and the hairy-tailed mole (*Parascalopus breweri*), which is found throughout Vermont and New Hampshire, southern Maine, central and western Massachusetts, and northwestern Connecticut. Soil moisture content, soil type, and food limit mole activity. Moles generally avoid heavy clay or stony, coarse gravel soils and areas that are too dry or wet to support their tunnels. The star-nosed mole prefers habitats characterized by poorly-drained or moist soils, particularly around wetlands, whereas both the eastern and hairy-tailed moles prefer drier habitats. Individuals of any of the three species can swim, but the star-nosed mole is most adept and seen frequently in water.

Moles are approximately 4-8 inches in length from nose to tail. They have short, powerful forefeet with broad outward-turned palms and prominent digging claws, small eyes and ears, short, black or brownish-gray velvety fur, and a somewhat elongated head and neck. The snout of the star-nosed mole, as its name suggests, is characterized by a prominent fleshy protuber-

HAIRY-TAILED MOLE

EASTERN MOLE

STAR-NOSED MOLE

ence with 22 short "tentacles" radiating from it. These tentacles are believed to aid the animal in sensing its environment and are found in no other mammal. Eastern and hairy-tailed moles may be distinguished by differences in their tails. The tail of an eastern mole is short (0.6-1.2 in.) and naked whereas that of the hairy-tailed mole is longer (0.9-1.4 in.) and covered with stiff hairs. Male eastern and hairy-tailed moles typically are larger in size than their respective females whereas the sexes of the star-nosed mole are approximately equal in size. Tactile hairs on the snout, forepaws, top of the head, and tail enhance the sense of touch, but moles have a poor sense of smell and sight (although they do appear to be able to detect light from dark).

Although many people believe moles are a type of rodent, like mice and rats, they actually are members of the scientific order *Insectivora*, which also includes animals like shrews. Their diet consists of earthworms, snails, slugs, and insects (both adult and larval stages), but also may include small amounts of vegetation and seeds. However, moles destroy few plants or bulbs by direct feeding. Because moles expend a tremendous amount of energy during tunneling, they are active both day and night year-round in their search for food. They often consume an amount of food equal to 60-100% of their body weight daily. To satisfy this almost insatiable demand for food, one mole will cover a substantial area each day (up to 150 feet of new tunnels). They are most active in early morning and late evening on damp, cloudy days during the spring and fall and may be seen above ground at night or when they disperse to new areas.

All moles in the Northeast except the star-nosed mole are solitary creatures, coming together only during the spring (March-April) breeding season. After a 4-6 week gestation period, females produce one litter of 2-5 young (up to 7 in star-nosed mole) each year. Nest chambers are constructed 12-18 inches underground, often beneath a large stone, tree, sidewalk or roadway. Young moles leave the nest at about 5-6 weeks of age and become sexually mature by the end of their first year. Moles may live up to 4 years in the wild. Predators of moles include snakes, skunks, foxes, weasels, coyotes, hawks, owls, and domestic cats and dogs.

Moles construct two types of tunnels: those at or near the surface and those deep (6-20 in.) underground. The network of interconnecting trails visible above ground and just under the surface are feeding tunnels that often are used only once. Deep tunnels are the highways that lead to feeding and living chambers and provide cover against predators. Hairy-tailed moles may use the same burrow system continuously for up to 8 years. Although all species of moles make feeding tunnels, eastern moles usually create the prominent ridges of heaved soil visible at the surface whereas star-nosed moles typically are responsible for the large (1-2 ft. diameter, 4-9 in. high) "mole hills" pushed up from below.

ECONOMIC STATUS AND IMPORTANCE

Moles are beneficial because they consume the larvae and adults of pest insects, such as Japanese beetles, that affect garden, landscape, and flowering plants. Additionally, their tunneling activity loosens the soil, improves aeration, and mixes deeper soils with surface material, all of which enhance soil quality. Moles can be a nuisance when their tunneling disturbs lawns and recreational facilities. Although moles frequently are blamed for feeding on roots of vegetation or seeds planted in gardens, they usually do not cause such damage. Garden plants may be uprooted or heaved out of the soil inadvertently by the mole's tunneling activity. However, commercial bulb growers and producers of row crops can sustain substantial economic loss to moles when plants are dislodged and subsequently die from desiccation or when harvesting equipment is damaged following contact with mole hills.

MOLE TUNNELING

MANAGEMENT OPTIONS

For commercial agricultural producers, elimination of moles over large areas is difficult, and probably not feasible. Homeowners, however, can control moles with minimal effort and some persistence. Because moles usually are solitary and have a rather low productivity, most residential yards can be maintained "mole-free" for a number of years. Homeowners with a serious Japanese beetle problem in their yard should carefully evaluate the wisdom of trying to eliminate moles; such action may actually make the beetle problem worse.

A variety of sonic and vibration producing control devices are available commercially as means to control moles but they have yet to be proven effective, despite claims made in advertising.

Similarly, many "home remedies", such as gasping with auto exhaust, placing broken glass, pins or other sharp objects in the tunnels, and use of harsh household chemicals, generally are ineffective and may be hazardous to humans, pets, or the environment.

Repellents/Toxicants

Effective repellents are not available and toxicants used to kill moles are classified for "Restricted Use Only". In the past, insecticides have been applied to lawns to reduce the number of beetle grubs, which are a major food of moles. The reasoning was that with a reduced food supply, moles would leave the area. In practice, applications of insecticide have been ineffective because moles feed on a variety of invertebrates, not just grubs. Furthermore, some of the insecticides that were applied were toxic to wildlife, particularly songbirds. Therefore, toxicant application should be left to licensed or certified pest applicators. Application of white milky spore, a naturally-occurring fungus now available in commercial form, may help reduce the number of grubs and limit the mole's food supply somewhat. However, with other food items still available, this option alone may not successfully reduce mole numbers.

Barriers

Sometimes small, limited areas, such as seedbeds or small gardens, sustain persistent mole damage. For such areas, installation of a barrier made of sheet metal or hardware cloth may be appropriate. Such a barrier should begin about 5 inches above the ground surface and extend to a depth of at least 12 inches, then bend outward at a 90° angle for an additional 10 inches. All connections in the barrier must be secure if it is to be effective.

Trapping

Trapping may be an effective technique to reduce local mole populations. Two options are available: use of lethal devices or use of live traps. Use of "kill traps" (e.g., harpoon or body gripping types) as a means of eliminating mole damage may be dangerous to those unfamiliar with their operation. These traps can be difficult

to set and properly place without risking personal injury. Additionally, there is potential for injury to small children and pets playing near or with unattended mole traps. For these reasons, it is recommended that trapping with these devices be left to those with appropriate training.

To live trap moles, one uses a container into which the moles will fall and be unable to escape (commonly called a pit trap). However, you must first determine which runways are active before installing these devices. The best time to trap moles is in the spring, as soon as the first ridges are noted, or after the fall rains. The selection of a main or frequently-used runway is of prime importance. To determine which runways are active, stamp down a short section of each runway and place a marker at each of these locations so that you will be able to locate them again. Observe for signs of mole activity daily for several days and restamp any newly-raised sections. If a tunnel is raised daily, it is an active runway. This is where a pit trap should be placed.

To construct a pit trap, dig a small hole in the most active runway and place a #10 tin can (approximately 7 inches in diameter and 10-12 inches deep) in the hole. Be sure the top of the can is level with the bottom of the runway. Fill and pack tightly around the can, and then plug both sides of the runway with soil right to the lip of the can. You may also want to stamp the runway about 1 foot on both sides of the can. Cover the top of the hole with a board, shingle or other suitable material that will block light yet allow easy access later. In reopening the runway, the mole will fall into the can and usually is unable to escape. If the tunnels are not reopened or you fail to catch a mole within 1-2 days, move the device to another active runway.

Captured animals may be released in areas of your property where they will not cause a problem or they may be humanely euthanized. Regardless of whether you believe any harm will result from your action, it may be illegal to transport a live nuisance animal from your property (e.g., state law prohibits such activity in Massachusetts). Check with your state wildlife agency or local extension agent for information before relocating any wildlife.

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- Massachusetts Division of Fisheries and Wildlife
- University of Massachusetts Cooperative Extension System
- University of Massachusetts, Department of Forestry and Wildlife Management
- New Hampshire Fish and Game Department
- University of New Hampshire Cooperative Extension
- Vermont Fish and Wildlife Department
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COMMONWEALTH OF MASSACHUSETTS
DIVISION OF FISHERIES AND WILDLIFE

CONTROL OF COTTONTAIL RABBITS

Rabbits (including hares and jackrabbits) are not rodents but are part of another large mammal group called "lagomorphs" or Lagomorpha. These mammals have a second small pair of upper incisor teeth directly behind the front ones. There are several species of cottontails in the United States; two of these, the eastern and the New England cottontail, are found in Massachusetts. Unlike hares (which give birth to precocial young which are active immediately), cottontails young are weak and feeble and are sheltered in the nest for 2-3 weeks after birth. Cottontails breed from mid-February through September and may have 3 or more litters per year.

Cottontail rabbits are an important prey for many species of avian and mammalian predators and are also game animals which furnish a great deal of hunting recreation. As such, they are protected by state law and can only be taken during restricted hunting seasons or as otherwise provided by law. However, in some localized areas, cottontails may cause damage to farm and garden crops during the summer. In winter, they may turn to tree nurseries, orchards, and ornamental shrubs. It is at these times that rabbit control may be necessary to reduce damage.

Habitat Control

Cottontail rabbits prefer dense thickets or heavily vegetated areas in which to live. Cover of this type is necessary for food and protection from predators. Overgrown ditch banks, brushy fence rows, or brush piles within or adjacent to croplands, nurseries, or orchards may be major factors contributing to rabbit damage. Cottontails leave this cover at night or in the early morning, feed in crop areas, and return to the thicket for protection during the day.

Mowing, brush cutting, and general cleanup of overgrown areas may be all that is needed for rabbit control. Without sufficient cover, rabbits do not stay in exposed areas.

Trapping

Live trapping can be an effective means of removing individual animals causing damage to gardens or other crops. Although rabbits are active at any time of day or night, the height of their activity is just before sunrise and just after sunset; thus, live traps should be set prior to these peak activity periods. Cottontails usually do

not have definite trails going from their cover to their feeding grounds. There may be one or two fixed points where rabbits regularly enter. These points of entrance and areas showing constant rabbit activity or damage are the logical places for setting live traps.

Metal live traps ("cage" or "box" traps) may be purchased from hardware or farm supply stores. Wooden live traps, such as those used by the Pennsylvania Game Commission (see attached), can be easily made at home.

Fencing

Rabbit-proof fences will aid in protecting small home gardens or other areas of valuable crops. Generally, a two to four-foot high fence of 1-1/2 inch galvanized mesh wire or "chicken wire" is a sufficient barrier. This type of fence must be thoroughly staked to the ground and the bottom edge buried to a depth of 4-6 inches in order to prevent the rabbits from burrowing or crawling beneath it.

Tree Guards

Tree trunk guards are also effective in preventing rabbit damage to trees or shrubs. These guards should be of a material heavy enough to prevent rabbits from chewing through them. Poultry wire of 1-inch mesh, 20 gauge, in strips 12-18 inches wide can be formed into cylinders around trees. These should be braced away from the tree to prevent the rabbits from bending the wire and reaching the tree. Tree guards may also be available from a number of commercial sources; check with your local farm supply store.

Repellents

Taste repellents have often been recommended as a method of reducing rabbit damage. Many of these afford only temporary protection and must be applied too often to warrant their regular use. Most are not registered for application to plants which will be harvested for human use. Additional factors which determine the effectiveness of a repellent include: thoroughness of application, weather conditions, and proximity of existing rabbit food and cover. The application must be heavy enough to withstand adverse weather conditions, since rain and snow may dilute the repellent or wash it off. Commercial repellents containing Thiram are effective and can be applied safely to trees and shrubs. However, be sure that use of any repellent is done in accordance with provisions of the Massachusetts Pesticide Act.

European rabbits (Oryctolagus cuniculus) are not cottontails. They are native to parts of southern Europe and northern Africa but have been widely introduced elsewhere and have often become serious pests. Unlike other rabbits, they dig their own holes and live in large colonies called "warrens". The European rabbit is the progenitor of the various breeds of domestic rabbit. So-called "San Juan" rabbits or "Belgian hares" are varieties of the European rabbit. They were released at various places in Massachusetts in the 1930's but did not establish themselves. They are now found in the state only on a few small coastal islands.

Adapted from a leaflet originally prepared by the U.S. Fish and Wildlife Service (1976).

RABBIT BOX TRAP

TRAP WITH ONE SIDE REMOVED

SECTION SHOWING METHOD OF SWINGING DOOR

SIDE ELEVATION TRAP SET

FULCRUM WIRE

9 3/4" Smooth *9 Galv. Wire

TOP VIEW - TOP REMOVED - TRAP SPRUNG

TRIP WIRE

13" Smooth *9 Galv. Wire

Scale: 2" = 1'-0"

Wood - 2 White Pine - Nails - 8d (for front frame) & 6d Cem. Coated Box

TYPE R-4
PENNSYLVANIA 6d
COMMISSION

COMMONWEALTH OF MASSACHUSETTS
DIVISION OF FISHERIES AND WILDLIFE

CONTROL OF TREE SQUIRRELS

Tree squirrels are found in most of the forested areas of the United States. In the Northeast (including Massachusetts), there are three kinds of tree squirrels-- the gray squirrel, the red squirrel, and the flying squirrel. There are two species of flying squirrel, but they may be hard to tell apart. Fox squirrels do not occur in New England. The black squirrels seen in some areas are merely a color phase of the gray squirrel.

The red squirrel is usually found among cone-bearing trees, whereas the gray squirrel is usually found in hardwoods. Flying squirrels are active at night, while the red and gray squirrels are usually active during the early morning and late afternoon. Around human dwellings, gray squirrels may sometimes be active all day. Tree squirrels do not hibernate, although during severe cold or wet weather they remain in their nests for several days. A litter of two to seven young is born in the early spring, with a second litter sometimes arriving in late August. The young remain in the nest at least six weeks before going out on their own.

Tree squirrels are usually beneficial. Gray squirrels are protected by law and may be hunted only during a limited fall hunting season. At the present time, red and flying squirrels are unprotected and may be hunted by licensed hunters year-round. In some instances, tree squirrels may cause damage and it becomes necessary to control them. They may invade attics, destroy growing plants and fruit, dig up newly planted bulbs, and strip bark and leaves from shade trees and shrubs. Utility companies report that squirrels often cause them considerable work and expense when the animals gnaw through cables. Squirrels have also invaded orchards during the late summer and have been known to destroy from 500-600 bushels of fruit in one orchard in a few days. In a few instances, gray squirrels have attacked and bitten pedestrians in public parks, perhaps because they are accustomed to hand-feeding. Red squirrels tend to be aggressive and unsociable and will defend their territory against other squirrels and birds. The alleged hostility of red squirrels for grays is probably related to this territorial behavior rather than to any inherent "enmity" between the two.

Blocking Squirrels from Buildings: Tree squirrels usually enter through openings near the eaves of a building. Check for unscreened attic ventilators, loose louvers,

and spaces under eaves where the sheathing does not fit the overhanging roof. Knots that may have fallen out from boards leave holes which may be enlarged by squirrels. These holes should be patched. Openings where telephone and electric cables enter a building may also be used by squirrels, or the squirrels may gnaw the cables themselves. Metal flashing around chimneys may also work loose, leaving an opening for the squirrels. They may also crawl down fireplace chimneys and can enter the house when the damper is not closed securely. Close large openings around water and waste pipes, too. Check the doors and the windows; if left open and not screened, squirrels may enter that way.

At times, squirrels jump on roof tops from nearby trees. Metal bands about two feet wide, fastened around the trunks at a height of six to eight feet, will usually keep squirrels from climbing isolated trees, but are valueless if squirrels can jump from tree to tree. If possible, prune branches near the house so squirrels cannot jump from the tree to the roof. Colorless paint or wood preservative containing zinc naphthenate may sometimes be used to protect trim or shingles which squirrels are gnawing. However, be sure that the paint is suitable for the surface you apply it to so that it will not stain or damage the original surface.

Protecting Trees: Use of metal bands on trees and removing low-hanging branches so squirrels cannot jump up to the limbs will prevent squirrels from damaging fruit and shade trees, if the trees are far enough apart so that squirrels cannot cross from tree to tree.

Catching Squirrels: Squirrels usually follow regular routes of travel and box or cage traps placed in such areas can prove quite effective. Be sure the trap works easily and closes tightly enough to hold the trapped animal. It should be large enough so that the doors do not close on the squirrels' tail, thus blocking the door from latching. It should be small enough, though, so that you do not catch other animals, such as skunks and cats. Good baits include nut meats, pumpkin or sunflower seeds, peanut butter, rolled oats, and similar items. Place the trap toward the trail or near the base of a den tree or a place where the squirrels are feeding. Check the trap regularly, particularly if the trap is in a sunny area and the squirrels can become overheated.

Conibear Traps: Conibear traps, size #110, or others of similar design, may be used inside buildings in attics or crawl spaces to kill squirrels which are chewing wires or causing damage which cannot be controlled otherwise. Be sure you know how to set these traps and set them only inside where other animals or persons cannot be caught or spring them.

Shooting: If discharge of firearms is permissible in your area, squirrels may be shot with a .22 rifle or a small gauge shotgun. Be sure to comply with state and local laws regarding shooting and the discharge of firearms. Shooting is usually most effective in the early morning and late afternoon.

Adapted from a leaflet originally prepared by the U.S. Fish and Wildlife Service (1976).

COMMONWEALTH OF MASSACHUSETTS
DIVISION OF FISHERIES AND WILDLIFE

CONTROL OF RATS AND HOUSE MICE

Two species of rats have been introduced to New England from Europe. These include the black rat (Rattus rattus), which was brought over by the first settlers in the 1620's, and the brown or Norway rat (Rattus norvegicus) which was introduced around 1775. The Norway rat has proved more aggressive and has displaced the black rat, which is not now found in Massachusetts. The common house mouse (Mus musculus) is also an introduced animal, having also been brought in inadvertently by the colonists. It is most common in urban areas and around farms.

The Norway rat and house mouse are considered to be pest species, rather than wildlife, and are not protected by state laws.

Description and Habits: House mice are typically dark gray on the back and ashy gray on the abdomen. Variations occur all the way from black to nearly white. The ears are large and prominent. The tail is small and slender, being about the length of head and body combined. They are quite small, weighing about 3/4 ounce. They may sometimes be confused with immature white-footed mice, which are also dark above and light below.

Rats may vary in color from almost pure gray to reddish brown or nearly black. Partial albinos may also occur. The average length of the adult Norway rat is 16-18 inches, including the tail, which is 7 to 7-1/2 inches in length. Norway rats weigh from 10-17 ounces, although a one-pound rat is unusually large. The average life span of a rat in the wild is only 8 months, however, they can live beyond three years in captivity.

Female house mice may give birth to young during any month of the year, especially in warm and secluded locations. The gestation period is approximately 21 days and from 5-8 litters averaging 5 young each are born during a single year. Juveniles are dependent upon the mother for about 3 weeks and may reach maturity in 2-3 months. Although caged mice may survive for two years or more, it is probable that few wild mice live for more than one year.

Rats breed at three to four months of age and probably continue to breed until death. The gestation period is 21 to 25 days. The young are weaned when three weeks old, often just prior to the birth of another litter. The female comes into heat about every five days and can breed within one day after giving birth. A female averages between 5-7 litters annually consisting of 8-10 young each.

However, litters may contain as many as 20 young and as many as 14 litters annually have been recorded. Natural mortality can be high; however, under normal conditions, each pair annually produces 60-70 young which survive to breeding age. While breeding is usually greatest during spring and fall, 20-30 percent of the females in a colony are usually pregnant at any given time.

House mice and rats eat the same foods as man, but, under natural conditions, are primarily seed eaters. Foods high in protein or sugar content, such as peanut butter, bacon, ground meat, cheese, cookies, and candy are readily consumed. The diet varies in different environments and some animals can live on live insects, starchy clothing, and glue in book bindings. However, when necessary, they will eat and thrive on virtually any edible item.

Rats and mice are color blind. Their depth of vision is limited to about a few feet in rats and 6 inches or so in mice. They can distinguish movement farther away, however. They have a well-developed sense of smell and taste which aids them in avoiding poorly prepared toxic materials. Their hearing is exceptionally good and they seem to recognize higher frequency sounds than do humans. Their facial "whiskers" and body hairs are very sensitive to touch and aid them as they move about in confined spaces. Regular travel routes are marked by dark smudges on the sides of tunnels and runways, due to the animals' rubbing on them. They are often cautious of anything new and the displacement of a familiar object may disturb them for a time.

Rats and mice are good swimmers. They will sometimes swim through sewer lines and enter homes through floor drains. It is not uncommon for them to climb pipes as high as the second story and emerge. A large rat can reach vertically 18 inches and jump three feet with a running start. They have been known to fall four stories without apparent harm. It is possible for young rats to go through a 1/2-inch hole and house mice can pass a 3/8-inch hole.

The front incisor teeth of rats grow continually. They must gnaw in order to wear back the teeth. They can chew through lead pipes, three inches of poorly formed concrete, oak planks, and sun-dried brick.

While rats and mice are primarily burrowing animals, they can climb when necessary. Rats prefer to live in burrows or tunnels in rubble 8-18 inches underground. A long-established colony might have tunnels extending the length of a city block. In light sandy soil, they have been known to burrow down to 6 feet.

Rats usually start their search for food and water after sunset each day. They apparently feed twice during the night; once shortly after dark and again in the early evening. The average rat needs $\frac{3}{4}$ to 1 ounce of dry food and 1-1/2 ounces of water every 24 hours. Without food, they will start to weaken in 3-4 days, but, without water, they weaken in 1-2 days. Mice are not as reliant on water and have been kept in captivity on dehydrated food containing less than 5 percent moisture for periods of up to one year. This difference is a factor in baiting for the 2 species.

If food and shelter are present, house mice may spend their entire life span within a 25-foot range. Rats generally travel over a wider distance, but their movements are also correlated with the availability of water, food, and shelter. When disturbed by construction or other large-scale displacement, rats have moved as much as four miles in one week.

Economics: Rats and mice transmit over 35 known diseases to man and domestic animals. They also carry several kinds of lice, fleas, and ticks. Disease is spread by their excrement, their parasites, and their bites. Among the human diseases carried by rats are plague, typhus, infectious jaundice, rat-bite fever, salmonellosis, and trichinosis.

The vast economic losses are also significant. During the period April 1959 to March 1960, the U.S. Food and Drug Administration made 370 seizures due to rat and mouse contamination. The total poundage of contaminated food was 7,092,700. Samples of grain taken directly from combines indicate that 5-9 percent of the wheat in some areas contained rodent droppings. The degree of contamination varied from zero to 4500 per kilogram (2.2 lbs.). One pair of rats living in a granary eats approximately 27 pounds of food in 6 months, but contaminates 10 times as much. During this time, the two rats produce 2-4 pounds of droppings and 1-1/2 gallons of urine, and shed one million hairs.

Rats and mice can also start fires by damaging insulation on electric wiring. A survey of 39 cities in the 1960's showed that 530 fires were started by rodents.

Control: The best control of rats and mice is to take away the food and shelter that permits them to survive. Traps, poisons, and other methods are only stop-gaps which can temporarily halt a growing population or which can be used against individual animals which find their way into an otherwise secure dwelling.

Light infestations of rats and mice can be removed through the use of ordinary snap traps. These should be placed at right angles along walls between objects, or by holes and damaged materials, so that the trigger mechanism intersects the animal's route of travel.

An attractive bait is chunky peanut butter smeared over the trigger surface. Other good baits are cake, doughnuts, bacon, nut meats, cheese, and soft candies. A sprinkle of rolled oats or dry cereal over and around baited traps is sometimes helpful. Trap-shy individuals may be caught by hiding the whole trap under a layer of flour, rolled oats, or similar dry light-weight bait. At times, a wad of cotton attached to the trigger may attract mice searching for nesting materials.

Poisoning: Toxic rodenticides are sometimes helpful in controlling large infestations where trapping is impractical. No one bait or poison is universally effective, and many rats and mice are now resistant to the more common chemicals. For this reason, it is desirable to use poisons as little as possible and to rotate their use. Only those poisons approved under state law should be used and they should be used only by trained personnel having the appropriate permits.

The selection of poisons should be consistent with human safety and that of domestic and wild animals. Anticoagulants (diphacin, fumarin, pival, warfarin, PMP) cause death by internal bleeding. They are the least hazardous of the rodenticides and are highly effective on an unexposed population, but are slow acting. Small amounts of them must be consumed daily for 5 or more days in order to produce death and several weeks may elapse before complete control is attained. They may be purchased ready-mixed or as a concentrate. For large-scale use, the concentrate is most economical. The basic bait mix consists of 12 parts ground yellow corn meal, 5 parts rolled oats, 1 part vegetable oil, and 1 part granulated sugar, mixed with the anticoagulant according to the manufacturer's instructions. Precautions should be taken to prevent contamination of food and to protect humans and pets from accidental poisoning (see M.G.L. c. 270, s. 3A). Place baits carefully in protected bait stations and promptly pick up and dispose of dead rats and mice. Note that anticoagulants such as warfarin ("D-Con") are formulated for use on rats and mice and should not be used to control other animals, such as squirrels or rabbits.

Adapted from leaflets prepared by the U.S. Fish and Wildlife Service (1977).

NORTHERN NEW ENGLAND ANIMAL DAMAGE CONTROL PROGRAM
EDUCATION LEAFLET SERIES

PORCUPINE (*Erethizon dorsatum*)

BIOLOGY AND BEHAVIOR

New England's second largest rodent characteristically appears as a dark, spherical silhouette amidst the forest canopy. Closer observation reveals a short-necked, short-limbed, plump body form, conspicuously quilled from head to tail. Overall length of adults ranges from 24-34 inches (60-85 cm.), with the muscular, triangular tail comprising 7-9 inches (17-23 cm.). The renowned quills, numbering to some 30,000, are hollow-shafted, barb-tipped, and lacking only along the underbelly, ears, and snout. Porcupine coloration generally presents a dominantly black pelage with lighter highlights, although chestnut, light brown, and albino variations may occur. Typical adult weights range from 9-14 lbs. (4-6.5 kg.), with reported records of older males of 38 lbs. (17 kg.) in the Western subspecies.

Geographical distribution of the porcupine in New England includes all suitable habitat throughout Maine, New Hampshire, and Vermont, extending south to the hills of northcentral and western Massachusetts, and northwestern Connecticut. Although use of wetlands and agricultural areas within this range is common, stands of mixed hemlock and hardwood forest provide the most constant source of food and shelter. Porcupines do not hibernate; but winter dens are established along hillsides among the rocky outcrops and talus, or within hollow trees, logs, dry culverts, or deserted human structures. Primarily nocturnal, the porcupine's peak activity begins at dusk.

Social behavior among porcupines is limited. While mutual tolerance at optimal winter den sites is common, solitary behavior prevails much of the year. Breeding may occur throughout autumn, with the birth of a single, 1 lb., fully quilled "porcupette" (juvenile) in late spring. Maternal bonds wane during late summer, with total independence of the young by September.

Dietary preferences of porcupines follow cycles of seasonal availability. While inner bark layers and foliage of Eastern hemlock and other conifers must primarily suffice as winter's meager fare, the buds, catkins, foliage, and mast (beechnuts and acorns) of hardwoods provide higher nutritional offerings during warmer months. Among the most significant of these sources are sugar maple, beech, birches, and oaks. Ground feeding is prevalent in some areas during spring and summer. Favored vegetation includes grasses, herbs, and aquatic plants, as well as agricultural crops.

ECONOMIC STATUS AND IMPORTANCE

Porcupines are responsible for supplying significant winter browse in the form of "niptwigs" to highly valued game species during years of heavy snow cover. With foraging efforts hampered by the elements, white-tailed deer and snowshoe hare benefit from evergreen boughs and twigs cut, partially consumed, and dropped by the porcupine from its canopy feeding perch.

However, feeding behavior also forms the focal point of most porcupine/human concerns and conflicts. Allegations of severe damage and economic loss to woodlots, orchards, commercial forests, and cropland have often prompted extreme "pest" control measures. In fact, porcupines rarely girdle the bark from trunks or major limbs; thus mortality among foraged trees is extremely low. Sawtimber stands or conifer groves near winter dens may suffer stunted and deformed crowns of individual trees of preferred nutritional quality. Similarly, remarkable selectivity may occur in apple and cherry orchards, with only a minority of trees bearing fruit of optimal acidic content being foraged.

In answer to their critical need for dietary sodium, salts found in plywood and building products, or utilized in de-icing winter roads are actively sought by porcupines. In areas of dense porcupine populations, damage to dwellings and automobiles (tires, hoses, wiring) may be significant.

CONTROL TECHNIQUES

Prior to implementing any control measures, thoroughly inspect areas of suspected porcupine damage for characteristic signs. Scat (fecal droppings) is generally abundant at den sites, and commonly found about the base of feeding trees. Look for nip-twigs—partially defoliated thick twigs and small branches with acutely angled severed stems. Consult field guides to confirm the tracks and wide, distinctive snow trough of the waddling-gaited, tail-dragging porcupine.

Non-lethal Control

Although their expense may warrant cost/benefit considerations, the effectiveness of mechanical barriers to porcupine depredations is well documented. Individual seedlings and young saplings may be sheathed in protective plastic tubing or enclosed by wire baskets. Larger trees can be protectively banded in aluminum flashing of 24" minimum width secured at a height above snowline. Simple adaptations of this technique may be applied to posts and buildings. Exclusionary fencing is accomplished via 18" width poultry mesh, tautly stretched, yet closely conforming to all ground contours. Above this netting a single strand of electric wire is strung (1.5" gap) to discourage climbing. Chemical deterrents have demonstrated variable success. Rodent repellent sprays containing thiram are available at garden supply retailers. Common wood preservatives applied to exterior plywood and decking should contain copper naphthanate or pentachlorophenol. In areas of substantial porcupine damage, forest practices such as thinning may need to be reduced to maintain a closed canopy, thereby suppressing ground cover and understory age-classes favorable to higher porcupine densities. However, harvesting hemlock in proximity to favored den sites will limit potential winter forage. Following any harvest, burning or removal of logging debris prevents future denning by porcupines in slash piles, snags, and downed logs. Public awareness and tolerance of natural predators improves the potential of biological control. Reintroductions and rising populations of fishers, bobcats, and coyotes in northern New England provide a significant check on porcupine densities. Public awareness and action regarding alternative de-icing techniques to rock salt would dramatically reduce damage to automobiles from sodium-starved porcupines. Sand, urea, calcium, and calcium-magnesium salts are all proven substitutes. The capture and relocation of live-trapped nuisance wildlife contributes to the spread of animal diseases such as rabies. Always a poor management tool, it is now prohibited by law in most areas.

Lethal Control

The use of toxicants or steel-jaw traps to control porcupines has generally proven ineffective, labor-intensive, or highly hazardous to non-target species. Special permits for their use beyond barns and dwellings must usually be obtained from local wildlife officials. Due to its effectiveness and target-specificity, hunting is the method of choice when the necessity of lethal control of an offending individual dictates. Fresh snow conditions facilitate tracking and location of the den or feeding trees.

Wetland areas adjacent to damaged property are best scoured at night using a spotlight during warmer seasons. Always consult with local wildlife authorities prior to implementing any means of lethal control.

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PARTICIPATING AGENCIES

- USDA APHIS-ADC, State Directors for Maine, Massachusetts, and New Hampshire/Vermont
- Maine Department of Agriculture
- Maine Department of Inland Fisheries and Wildlife
- University of Maine Cooperative Extension
- Massachusetts Division of Fisheries and Wildlife
- University of Massachusetts, Department of Forestry and Wildlife Management
- University of Massachusetts Cooperative Extension
- New Hampshire Fish and Game Department
- University of Vermont, Fisheries and Wildlife Program

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Illustration prepared by Nancy Haver.

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NORTHERN NEW ENGLAND ANIMAL DAMAGE CONTROL PROGRAM EDUCATIONAL LEAFLET SERIES

BEAVER (*Castor canadensis*)

BIOLOGY AND BEHAVIOR

Beavers are chunky, yellowish-brown to brownish-black aquatic mammals. They have short legs, dexterous forefeet, large webbed hind feet, and a spatulate (broad and flattened), leathery tail. Bright yellow-orange incisors (front teeth used for gnawing) protrude from the mouth and are readily visible. The beaver is the largest North American rodent and attains an overall length, including tail, of 34-40 in. (86-102 cm.) and a weight of 27-67 lb. (12-30 kg.). Beavers have lived for up to 20 years in captivity, however, they rarely survive beyond 10 years in the wild.

Although beavers are native to New England, by the late-1800's they were nearly extirpated from this region by commercial overharvest. With the implementation of protective regulations and the help of successful beaver reestablishment programs by federal, state and private conservation agencies or organizations, these animals reoccupied most of the original range by the mid-1900's, and their numbers continue to increase locally throughout much of New England. Beavers occupy a variety of aquatic habitats, including streams and rivers bordered by woods, lake shores, impoundments, and marshes. They prefer water courses with low gradient and abundant, high quality foods.

Beavers are true vegetarians, consuming leaves, bark, small twigs, sprouts, fruits, and buds of shrubs and trees as well as aquatic plants (e.g., sedges, rushes). Woody plants preferred by beavers include alder, aspen, birch, gum, maple, poplar, and willow. A beaver may consume up to 20-30 oz. (567-850 g.) of food per day (approximately the amount of bark and smaller branches of a 1-3 in. [2.5-7.6 cm.] diameter tree every 2 days).

Beavers are usually nocturnal (active at night) but they may be observed during daylight hours as they make repairs to their structures or gather food. Their ability to build dams and lodges is well known. When beavers establish a new territory in suitable, unoccupied habitat, they build a dam before any other construction activity begins (usually April-June or August-October). Beaver dams range from 2-10 ft. (0.6-3.0 m.) in height and can extend more than 100 ft. (30 m.) in length. Lodge building, or bank den excavation, and creation of a food cache (a pile of freshly-cut branches placed in the pond next to the lodge that will remain accessible as a food supply beneath winter ice) begin in August or September, after the dam is completed and the level of water in the pond stabilizes. Lodges often exceed 5

ft. (1.5 m.) in height and 20-40 ft. (6-12 m.) in diameter. After establishing a territory, beavers construct scent mounds (piles of mud and secretions of castoreum from the beaver's scent gland) about its boundary. It is believed this form of chemical communication warns beavers from outside the colony not to intrude.

Beavers are monogamous and, unless a mate dies, they pair for life. They breed in late-January and February and produce a litter of 3-5 kits during May or June. A typical beaver colony consists of the adults, their kits, and the previous generation of yearlings and may include up to 12 individuals. Two-year olds leave, or are driven away from, the colony to establish new colonies of their own; when dispersing, these offspring travel an average distance of 4 mi. (7.4 km.) from their natal colony.

ECONOMIC STATUS AND IMPORTANCE

The value of the beaver as a fur animal contributed significantly to the exploration of and western expansion of civilization in North America. Today, beavers are an important recreational and economic resource because of the value of their pelt and the role they play in modifying habitat. Beaver dams create or enhance wetland wildlife habitats, stabilize water flow, reduce siltation, and conserve water. Impacts on fisheries depend upon the type and location of that resource; cold-water species may suffer as water temperature rises in new beaver impoundments whereas warm-water species may benefit from more available habitat and food sources. Beavers can cause consider-

able damage to property by: flooding roads, septic systems, fields, and pastures; flooding or cutting timber or ornamental plants; and destroying water retention devices. Although many other potential hosts and vectors of transport exist, beavers often are blamed for contaminating public water supplies with *Giardia* cysts. For all these reasons and many more, the beaver is one of the most intensively managed wildlife species in North America and presents a great challenge to wildlife managers.

CONTROL TECHNIQUES

In New England, there are no federal regulations protecting beavers, however, each state has laws governing their capture, taking, and disposition. Consult local wildlife authorities before beginning any damage management program.

Preventive Measures

There are no known techniques to discourage beavers from occupying suitable habitat. Reports of deterring beavers through harassment with loud noise or bright lights are usually unfounded. Modification of habitat (removal of food and construction materials) has been suggested but remains untried and suspect.

Non-Lethal Controls

To protect ornamental plants or trees of high value from beavers, hardware cloth or wire mesh screening about 3 ft. (1 m.) in height can be wrapped around the base of the trunks and secured with wire twists. Exclusion fencing also may be used to restrict beavers' access to plants. Because both techniques are labor intensive and somewhat costly, they should be used only where the area of damage is small or the value of the plants involved is high. Chemosterilants (i.e., birth control) have reduced the productivity of captive beavers but an effective delivery method has not yet been devised to introduce these compounds to wild beaver populations. Partial or complete removal of dams or lodges usually is ineffective in reducing damage caused by an active beaver colony because they can repair or replace dams in less than 24 hours. Also, removal of structures associated with an active colony may be a violation of state wildlife laws as well as conflict with wetland protection regulations. Even where a colony has abandoned its pond, permits may be necessary to remove a beaver dam. Although used extensively in the past, livetrapping and relocation of individuals is discouraged because the practice is labor intensive, costly, and, in most cases, simply transfers problem beaver to another site. And, most habitat suitable for beavers already is occupied by active colonies. Installation of a water control device (e.g., 3-log drain, T-culvert, wooden box pipe) is useful in manipulating the level of water in a pond where maintenance of beavers' presence is desired.

Lethal Controls

Because beaver populations can increase substantially in a short period of time, the most effective way to minimize the potential for problems with beavers is to hold their numbers in check. Research indicates that the incidence of beaver damage is inversely proportional to the worldwide demand for and value of their pelts (i.e., when pelt prices and beaver harvest decline, reports of beaver damage increase). When properly conducted, trapping can be an effective technique for managing beaver populations. Consult your state wildlife agency regarding specific regulations or prohibitions on the use of traps and snares before placing any sets. Shooting at night with spotlights may be effective in eliminating problem individuals, but special authorization is needed to do this. There presently are no toxicants or fumigants registered for use in the control of beavers.

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PARTICIPATING AGENCIES

- USDA APHIS-ADC, State Directors for Maine, Massachusetts, and New Hampshire/Vermont
- Maine Department of Agriculture
- Maine Department of Inland Fisheries and Wildlife
- University of Maine Cooperative Extension
- Massachusetts Division of Fisheries and Wildlife
- University of Massachusetts Cooperative Extension
- University of Massachusetts, Department of Forestry and Wildlife Management
- New Hampshire Fish and Game Department
- University of New Hampshire Cooperative Extension
- Vermont Fish and Wildlife Department
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Division of Fisheries & Wildlife

BEAVER MANAGEMENT IN MASSACHUSETTS

Beaver are a valuable renewable natural resource in Massachusetts. They are one of the few mammals that create their own environment in which to live. Their practice of damming and slowing down moving water, along with chewing down trees, has a tremendous effect on landscape in the state. Beaver have many positive aspects associated with their presence and activity in the state. These positive aspects include:

- creation of wetland habitat: which is valuable because wetlands function in sediment control, pollution control, ground water recharge, as water supplies, and in addition are important for aesthetic and recreational purposes.
- creation of wildlife habitat: beaver-created wetlands are extremely productive as wildlife habitat. These wetlands are utilized by waterfowl, mink, river otter, muskrats, raccoon, marsh-nesting song birds, turtles, snakes, and many other species.
- economic values: people harvest beaver as a fur and food product; approximately 1,300 beaver are harvested annually under a strictly regulated beaver trapping season. The value of harvested beaver in the past five years has generated in excess of \$150,000 for households in the state.
- aesthetic values: people like to watch or photograph beaver and the wildlife that use their habitat.

Beaver also have negative aspects associated with their presence and activity. Negative aspects include:

- road flooding & road culvert blockage
- railroad flooding
- chewing & damage to ornamental trees
- felling of trees on automobiles, electric powerlines and roads.
- flooding of wells and septic systems
- flooding of agricultural crops
- warming of cold water fish habitat
- carrying an intestinal protozoa (Giardia lamblia)

The Division receives hundreds of complaints regarding beaver damage yearly. One third of the towns in the state incur damage to highways and roads due to beaver activity. The resulting damages costs taxpayers hundreds of thousands of dollars annually.

(OVER)

Division of Fisheries & Wildlife

Field Headquarters, One Rabbit Hill Road, Westboro, MA 01581 (508) 366-4470

An Agency of the Department of Fisheries, Wildlife & Environmental Law Enforcement

Population status:

Beaver are an abundant furbearer and a protected species in Massachusetts. The Division has re-established beaver throughout the state. There are viable beaver populations in all suitable habitat throughout the state.

Division management goals for beaver are:

- Maintain beaver populations compatible with suitable habitat
- Manage beaver for their wetland values
- Minimize beaver complaints and damage caused by beaver

Methods used to achieve management goals:

Regulated harvest, by trapping, is the method used to manage beaver populations. Wildlife biologists regulate harvest by adjusting trapping laws for beaver. There are over 20 laws governing the harvest of beaver during the trapping season (Nov. 15 - Feb. 28). Fur prices can also affect the harvest. More beaver are harvested during years when prices are high than in years when they are low.

In addition, at suitable sites where beaver are causing property damage, the Division investigates complaint sites and explores ways to help landowners alleviate damage. This program utilizes flow devices to control the level of water in an effort to manage the site for wildlife habitat, and alleviate the negative aspects of the beavers' presence.

COMMONWEALTH OF MASSACHUSETTS
DIVISION OF FISHERIES AND WILDLIFE

CONTROL OF FOXES

Life History:

Two species of fox are found in Massachusetts, including the red fox (Vulpes vulpes) and the gray fox (Urocyon cinereoargenteus). Foxes of one species or another are found throughout Massachusetts, except on Martha's Vineyard and Nantucket, and probably in the urban Boston area (Suffolk County). Both foxes are the size of a small dog, though the gray fox (7-13 pounds, 32-45 inches in total length) is often slightly smaller than the red (10-15 pounds, 36-41 inches). Red foxes are generally yellow-red or rust-red above with whitish underparts, a white-tipped tail, and black legs and feet. Color variants, including the dark "cross fox" and grizzled "silver fox" occur uncommonly. The gray fox is generally grayish "salt-and-pepper" with rusty red areas on the neck, legs, and underside of the tail. The top of the tail is black, with no white tip. Both foxes have large bushy tails.

Red foxes inhabit a diversity of broken or mixed habitats, including open hardwoods, farmlands, woodlots, pastures, brushy areas, and suburban areas broken up with small parks and undeveloped areas. Gray foxes, on the other hand, are more of a forest animal, preferring dense hardwood or mixed hardwood-coniferous forests and rough or rocky terrain. Gray foxes are skilled tree climbers. Red foxes sometimes dig their own den but may often take over a woodchuck burrow or an old fox den. Most denning areas are in similar sites year-after-year. Gray foxes rarely use burrow dens but rather use sites under logs or stumps, in hollow trees and logs, or in rock crevices and fissures.

Both red and gray foxes breed in mid-January to late February, with the pups born in late March or early April. There is only one litter per year, with 4-5 pups in the average litter. Communal denning may occur in red foxes with several families denning in close proximity. Red foxes are believed to mate for life. In both species, the pups are feeble at birth and remain in the den for 4-5 weeks. The adults sometimes move the young from den to den. At about 8-10 weeks in gray foxes and 12 weeks in reds, the pups are weaned and they soon leave the den. They remain part of the family group until late autumn, when they disperse and begin to fend for themselves.

Both red and gray foxes are opportunistic feeders, eating a wide range of small mammals, birds and eggs, reptiles, amphibians, insects, fruits and berries, nuts, grains, and carrion. Red foxes may cache their extra food by burying it or covering it with debris.

Both red and gray foxes are highly susceptible to rabies, although that disease is currently virtually absent in Massachusetts except in bats. Historically, there were outbreaks of fox rabies in Massachusetts, the last occurring in the 1930's. Both foxes are also susceptible to canine distemper. Sarcoptic mange-- caused by a small mite which infests the hair follicles--is very common in red foxes and is lethal to them. It is not a problem in gray foxes. Heartworm may also be found in foxes.

Damage:

Red foxes may prey upon domestic poultry, or small livestock such as lambs and piglets. They will also sometimes kill house cats. Depredations may be particularly important during the denning and pup-rearing period when the adults have to feed both themselves and their young. Gray foxes are less likely to cause damage than red foxes.

Sickly foxes may cause alarm when they appear in suburban back yards and act tame or fearless of humans. Young children may approach these animals and try to pet or feed them and may be bitten. Similarly, healthy foxes which are seeking food may learn to feed on pet food, table scraps, or garbage.

Control:

Wire net fences with openings of three inches or less will exclude most red foxes if the bottom of the wire is buried or secured with an apron so that foxes cannot burrow under it. Pens or coops should also be roofed, since red foxes will often readily climb a fence. Well-maintained electric fences with three wires spaced at 6, 12, and 18 inches above ground have also been used to successfully repel red foxes.

Sanitary practices should be maintained around livestock enclosures and dead poultry or livestock should be buried deeply or incinerated rather than thrown in the bush. Pet food should not be left outdoors and scraps from barbecues and cook-outs should be cleaned up. Garbage should be kept in secure containers.

Where lethal controls are lawful and necessary, foxes may be trapped in approved types of traps. The current trapping laws should be checked to ascertain the types of traps that may be used and the circumstances under which they are allowed. Foxes

are intelligent and can be difficult to trap if traps are not de-scented and carefully concealed. Adult foxes are difficult to trap in cage traps. Foxes may also be hunted or shot during the lawful hunting season or when otherwise authorized. State laws regarding the safe discharge of firearms must be followed. Foxes may sometimes be called in by the skillful use of a "predator call" which simulates the distress calls of prey.

Prepared by Mass. Division of Fisheries and Wildlife, May 1990.

THE EASTERN COYOTE

IN MASSACHUSETTS

It is very likely that coyotes currently live within your community. To make your property less attractive and to avoid having problems with them, here are some basic steps that you should follow:

- **Don't feed coyotes!** Feeding ultimately alters the animals' behavior. They become dependent upon and less wary of humans. This can lead to potential problems (bites, scratches, encounters with pets).
- **Don't leave pet food outdoors!** If you must feed pets outside the home, provide only the amount that your pet will finish in one feeding.
- **Don't approach or try to pet coyotes!** Don't provoke an encounter with a coyote by coming too close or restricting its free movement.
- **Do secure your garbage!** Coyotes knock over trash cans or tear open trash bags left in the open. Don't provide potential meals.
- **Do secure your pets!** Although free roaming pets are more likely to be killed by automobiles than by wild animals, coyotes and foxes do view pets as potential food. For the safety of your pet, keep it restrained at all times.
- **Do protect livestock and produce!** Consult with the Division of Fisheries and Wildlife for appropriate ways to protect property and stock animals from wildlife.

MORE COYOTE INFORMATION

Range and historical background of coyotes in Massachusetts: Coyotes originally moved into the central and western regions of Massachusetts in the 1950s, and they have been in the eastern sections and Cape Cod since the 1970s. This species is well established statewide.

Description: Coyotes are the size of a medium-sized dog, but with longer, thicker fur. Coyotes have a long, bushy, black-tipped tail that is usually carried pointed down. Their snout is long and slender, and their ears are pointed and erect. The pelts of coyotes in Massachusetts range from grayish-black to blonds, light tan, dark tan, or even all black. Females weigh 33-40 lbs and males are slightly larger (34-47 lbs). Coyotes can attain weights of 50-60 lbs. Because of their thick fur, weights of coyotes can easily be over-estimated.

Habits: Coyotes are usually shy and elusive. Male and female coyotes pair up, establish a territory, and breed in February or March; 4 to 8 pups are born in April or May. Activity is variable; they can be active night or day, and sightings at dawn or dusk are common. They remain active all year-round

and do not hibernate. Coyotes are often seen individually, in pairs, or in small groups. The area a coyote uses may vary from 4 to 30 square miles.

Food: They are opportunistic feeders and their primary foods include small rodents, rabbits, deer, birds, snakes, frogs, and insects. They will also eat fruits, berries, vegetables, garbage, and pet food left outdoors. In some areas they prey upon unprotected pets, including house cats, and have been known to attack domestic dogs. Because coyotes utilize so many different food sources, they have adapted to and live in a variety of habitats including urban and heavily populated areas.

Coyotes are an important natural resource in Massachusetts. They are classified as a furbearer species, for which an established harvest season and management program exists. If you are experiencing problems with, or have any questions regarding coyotes, contact the nearest regional office of Massachusetts Division of Fisheries and Wildlife.

**MASSACHUSETTS DIVISION
OF FISHERIES AND WILDLIFE**

**UNIVERSITY OF MASSACHUSETTS
COOPERATIVE EXTENSION SYSTEM**

FOR FURTHER INFORMATION, CALL MASSACHUSETTS DIVISION OF FISHERIES AND WILDLIFE AT:

Action 508/263-4347 • West Boylston 508/835-3607 • Pittsfield 413/447-9789 • Bourne 508/759-3406 • Belchertown 413/323-7632

University of Massachusetts, United States Department of Agriculture and Massachusetts counties cooperating. The Cooperative Extension System offers equal opportunity in programs and employment. Funding provided by the Northern New England Animal Damage Control Education Program under Grant No. 88EXCA-2-0870. CR-0332:7/93-7M. Printed on recycled paper. ♻️

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COMMONWEALTH OF MASSACHUSETTS
DIVISION OF FISHERIES AND WILDLIFE

CONTROL OF WEASELS

Life History: Two species of weasel are found in Massachusetts, including the ermine or short-tailed weasel (Mustela erminea) and the long-tailed weasel (Mustela frenata). The long-tailed weasel is the larger of the two, averaging about 16 inches in length whereas the ermine averages about 13 inches. Male weasels are distinctly larger than females. Both species of weasel may have a white coat in winter; however, this is most common in the ermine. Both species have a black tip on the tail. The ermine has a white line down the hind leg (summer coat), while the long-tailed weasel lacks the line. The underparts of the ermine are white, while those of the long-tailed are yellowish in color.

Long-tailed weasels prefer open woodlands, brushy areas, and agricultural areas with hedges and fencerows. Ermines generally inhabit low brushy thickets bordering streams in forested areas. There may be some habitat overlap, though, and both species appear to require open water for drinking. They den in old chipmunk burrows or other holes, in stone walls or rock piles, in fallen hollow trees, or similar sites.

Both species of weasel breed in summer and the young are born the following April or May. There are usually about 6-8 young per litter. They are blind and feeble when born but are active at about 45 days and leave the parents by about November.

Weasels feed on a variety of small prey including mice, rats, chipmunks, rabbits, small birds and eggs, frogs, small snakes, insects, and earthworms. They may eat carrion if other foods are unavailable. If one type of prey is particularly common, the weasels will usually continue to select that prey as long as it is available. Weasels are commonly thought to be "bloodthirsty" because, in some instances, they may kill more prey than they can eat. Actually, this behavior (called "surplus killing") is common in many carnivores and is not a conscious "choice" on the part of the animal. Normally, the weasel is stimulated to kill by the frightened behavior of the prey. Then, when the prey is dead, the weasel's feeding behaviors come into play. However, When confronted with a large number of prey animals, the weasel's killing instinct is repeatedly stimulated and there is no chance for the feeding instincts to take over.

Damage: Weasels may occasionally kill domestic animals, such as poultry, ducks, pigeons, rabbits, and similar-sized birds and mammals. Often, they are beneficial due to their predation on rats and mice.

Control: Preventive measures designed to exclude weasels from poultry houses are an essential step in eliminating damage. All openings larger than 1 inch should be blocked with 1/4 or 1/2-inch mesh hail screening or similar wire mesh. Window screening is not strong enough. Be sure that the weasels cannot push under the wire where it contacts the ground. Pens must also have a secure top, since weasels are good climbers.

When necessary, weasels may be trapped in small cage traps or wooden box traps (about 4x4x24 inches) baited with sardines or fresh meat. Traps may be set in hen coops, under brush piles, or along fence rows or stone walls.

Prepared by Mass. Division of Fisheries and Wildlife,
May 1990.

BLACK BEAR

(*Ursus americanus*)

BIOLOGY AND BEHAVIOR

The black bear is a large mammal with powerful limbs, a small head, and small ears. Adult females weigh 100-200 lbs. whereas adult males are larger, weighing 150-400 lbs. This species is characterized by several color phases, but bears in the Northeast usually are all black except for a brown muzzle. Some individuals may have a small, white chest patch. Black bears have 5 toes, each with a well-developed claw, on the front and hind feet and have teeth adapted for feeding on both plants and animals.

Black bears are found throughout much of Alaska, Canada, and the western and north central United States. In the East, they occur primarily along the Appalachian Mountains from Maine to Florida. Black bears inhabit forested terrain with thick understory vegetation and make extensive use of wetlands and riparian areas as sources of food and cover and as travel corridors. Black bears are omnivorous and will eat a variety of seasonally available foods, including skunk cabbage and grasses in spring, berries, fruits, and sedges in summer, and hard mast (beechnuts, acorns, and hickory nuts) in fall. Insects, small mammals, and deer fawns also may be eaten where available or when encountered. When natural foods are not abundant, bears seek alternate and accessible food sources, such as agricultural crops, beehives, and sometimes livestock.

Except for females with young or during the breeding season, black bears generally are solitary animals. During spring, summer, and fall, and particularly during the breeding season, bears may be active during daylight hours, usually at dawn and dusk, but they are rarely seen because they are so secretive and quiet. Bears

often become nocturnal where contact with humans is more frequent. Individuals of both sexes establish overlapping home ranges; the area utilized by an adult female is smaller (11 sq. mi.) than that of the more far-ranging males (120 sq. mi.). Females do not breed until 3 to 5 years of age, and then only reproduce every other year. Breeding occurs during June and July, but embryonic development does not begin until November or December. Two to 4 cubs are born in late January or early February while the female is denning. The young remain with the female throughout the next winter denning period and disperse the following spring. At that time, young males will move out of their mother's range whereas young females usually establish a range close to or overlapping their mother's. Mortality is highest among dispersing yearlings, especially males, as they travel considerable distances in search of suitable, unoccupied habitat.

Bears will den in brush piles, logging slash, hollow trees, under rock outcrops, or at the base of a tree. The onset of and emergence from denning is dependent upon the availability of food, but denning typically spans from early November to late March or early April in the Northeast. Denning, as exhibited by black bears, is not true hibernation. Although a bear's heart and respiration rates and body temperature decline slightly while denning, a bear will "wake up" if disturbed and may move to a new site if winter denning conditions are not favorable. Bears do not urinate or defecate throughout the winter.

ECONOMIC STATUS AND IMPORTANCE

The black bear is an important indicator species of the "health" of the environment and the particular habitats it frequents. It has been an important part of our natural heritage, both for its aesthetic and ecological values. Today, black bears are managed as a big game species in the Northeast and are hunted by permit only during regulated hunting seasons. The international commercial trade in selected body parts (e.g., gall bladders, paws, hides) from bears has led to an increased illegal harvest of all bear species, including the black bear. When natural foods are scarce, bears will use whatever sources of food are available. Potential conflicts between bears and agricultural producers, homeowners, or other affected parties arise where bears cause damage to property and crops as they search for food. Because of their inherent values, we should make every effort to co-exist with bears.

DAMAGE MANAGEMENT OPTIONS

To reduce the potential for damage to property, precautions should be taken before a bear develops an interest in or gains access to potential food sources. As with most wildlife damage problems, no one control technique will provide absolute protection from bear depredations. However, certain measures that are initiated in a timely manner, maintained properly, and applied with an understanding of bear habits and behavior can greatly reduce the extent and severity of bear damage. Although black bears are generally shy creatures, they are intelligent and possess good long-term memory capabilities. Furthermore, these are wild animals, and they will react to undue provocation accordingly. These traits should be accounted for when designing any damage management program for bears.

Preventive Measures:

To reduce the potential for damage by black bears, don't encourage their presence or attract them to your property. Be sure to 1) exercise good husbandry, 2) remove all sources of alternative foods (garbage or refuse, pet food, bird feeders, animal carcasses), 3) move domestic animals into protected areas and away from

areas with heavy cover, 4) maintain well-mowed, cleared corridors around beehives, agricultural crops, or livestock holding areas, and 5) alternate row crops to provide less cover. Don't knowingly feed bears at any campsite or near homes--this will only attract more bears and habituate them to humans.

Non-lethal Controls:

Non-lethal controls are used to prevent a bear from gaining access to property or a commodity. Such measures may include 1) erecting temporary or permanent electric or heavy woven wire fencing, 2) using bear hounds or guarding dogs to ward off depredating bears, 3) manipulating the habitat to make it unsuitable for or unattractive to bears, and 4) where practical, authorized, and allowed by state law, having state wildlife agency personnel capture and relocate an offending bear. Consult wildlife authorities in your state to determine whether this option is available to you. In most instances, it is illegal for a private individual to capture a live bear. There are no repellents registered for use on black bears.

Lethal Controls:

If all attempts to deter bears with preventive or non-lethal measures fail, removal of the offending animal(s) may be warranted. Because permits may be required and certain reporting procedures must be followed, individuals contemplating lethal action against depredating bears are encouraged to consult their state wildlife authorities before initiating such action. In most states, the owner of the property, a member of their immediate family, or a person under their direct permanent employment may be allowed to destroy a depredating bear, **but only when the animal is "in the act of causing damage."** Situations where the health or safety of a person is "at risk" from a bear also may constitute grounds for its destruction. However, because "risk" can be defined and perceived differently, there may be question as to whether the destruction of a bear was truly lawful. Regardless, any person destroying a bear is required to report such action and to surrender the bear's carcass to wildlife authorities within 24 hours.

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The Northern New England Animal Damage Control Education Program is a cooperative effort of the following agencies and institutions:

- Maine Department of Agriculture
- Maine Department of Inland Fisheries and Wildlife
- University of Maine Cooperative Extension
- Massachusetts Division of Fisheries and Wildlife
- University of Massachusetts Cooperative Extension System
- University of Massachusetts Department of Forestry and Wildlife Management
- New Hampshire Fish and Game Department
- University of New Hampshire Cooperative Extension
- Vermont Fish and Wildlife Department
- University of Vermont Fisheries and Wildlife Program
- U.S. Department of Agriculture, Animal Plant Health Inspection Service, Animal Damage Control (USDA APHIS-ADC) for Maine, Massachusetts, New Hampshire, and Vermont.

Text prepared by Sandra Robinson, research assistant, Department of Forestry and Wildlife Management, University of Massachusetts, Amherst, MA

Edited by James A. Parkhurst, Ph.D., Wildlife Extension Specialist and Program Leader, Northern New England Animal Damage Control Education Program, University of Massachusetts, Amherst, MA

Illustration prepared by Nancy Haver.

For additional information, contact:

The Cooperative Extension System offers equal opportunity in programs and employment. CR-0304: 12/92-5M

CO-EXISTING WITH BLACK BEARS IN MASSACHUSETTS

- DO NOT FEED BEARS:** feeding bears may place you or your family, friends, and neighbors in danger because bears accustomed to handouts lose their instinctive fear of humans and become unpredictable. You also place the animal in danger of having to be destroyed.
- WHEN CAMPING, STORE ALL FOODS AND WASTES PROPERLY:** don't store food in your tent, trailer, or other inhabited space; secure food in bear-resistant containers or hang it high between two trees or poles. Avoid cooking in, or immediately near, your tent where food odors may accumulate and attract bears. Dispose of all waste in bear-resistant dumpsters or bury deeply well away from the campsite.
- REMOVE OR SECURE ALL POTENTIAL SOURCES OF FOOD:** don't tempt bears by leaving or providing food within easy reach. Be sure all pet foods will be completely consumed at a feeding and not left in the dish. Remove bird feeders (especially those with suet) by early April. Store all garbage in a secure indoor location or in a bear-resistant receptacle.
- DO NOT APPROACH ANY BEAR IN THE WILD:** maintain a safe distance between yourself and any wild animal to avoid threatening it or instigating a confrontation. Be particularly aware of seemingly abandoned young cubs -- the adult female probably is nearby.
- BE ALERT IN AREAS WHERE BEARS MAY BE ACTIVE:** avoid travelling in gullies, along hedgerows, or in thick cover -- bears frequently use these areas as travel corridors.

BASIC LIFE HISTORY OF BLACK BEARS

The black bear is a large bodied (male: 150 to 300 lb; female: 100 to 180 lb.), dark brown to black mammal. All black bears are characterized by a light brown muzzle; some individuals may have a white patch on the chest. They have small, conspicuously furred ears that usually are held erect. They have large, well-padded feet equipped with 5 prominent claws. Bears have good eyesight and hearing, but rely primarily on their excellent sense of smell to locate food and recognize potential danger.

In Massachusetts, bears are found primarily west of the Connecticut River and north of the Massachusetts Turnpike. However, individuals, particularly young males, have been recorded as far east as Worcester and Middlesex Counties and south to the Connecticut/Rhode Island borders. They typically inhabit wooded wetlands, swamps, and

mixed hardwood and conifer forests with a dense understory adjacent to water sources.

Black bears are active during daylight (1/2 hr. before sunrise to 1 to 2 hr. after sunset. They may be nocturnal in areas where frequent contact with humans occurs (e.g., in campgrounds, dumps or landfills) or during the breeding season. They are not social animals and rarely group together (except at food sources during extremely lean natural food years). They have a relatively low productivity in that they produce 2 to 4 cubs every 2 to 3 years. Females first breed at 3 to 5 years of age. Onset of denning is variable, depending on availability of natural foods, but generally occurs between late November and early December and extends until early April.

For Additional Information About Black Bears, Their Management, And Damage Control Strategies, Contact :

MASSACHUSETTS DIVISION OF FISHERIES & WILDLIFE

Acton (508) 263-4347
Bourne (508) 759-3406
West Boylston (508) 835-3607

Belchertown (413) 323-7632
Pittsfield (413) 447-9789

WHITE-TAILED DEER (*Odocoileus virginianus*)

BIOLOGY AND BEHAVIOR

The white-tailed deer has long, slender legs, large ears, and a tail that, when the deer is alarmed, flares erect to reveal the fluffy white underside for which the animal is named. Deer are smaller than most people believe; they attain a total length of about 71 inches (180 cm.) and a height of 39 inches (100 cm.). Weight depends upon age, sex, and physical condition of the animal and upon the quality and quantity of food consumed. Typically, adult males weigh 100-250 lbs. (36-113 kg.) whereas females are somewhat lighter at 70-150 lbs. (32-68 kg.). In addition to their greater size, male deer also are characterized by branched antlers that grow each year and are shed after the breeding season. Coloration is similar between the sexes, but it varies seasonally. During summer, coats of deer are reddish tan and composed of short, thin hairs. In winter, deer take on a brownish gray color as thicker, longer, hollow hairs replace the summer coat. Fawns are born a chestnut brown color with conspicuous white spots on the back and sides that fade by 3-4 months of age.

With the exception of certain zones within cities and areas of northern New England located above treeline, white-tailed deer are present throughout the entire region. Deer prefer forest-edge habitats or thickets intermixed with glades, wetlands, or abandoned pastures. However, they readily adapt to and can satisfy their daily needs within the fragmented forests typical of most residential areas. Agricultural lands located adjacent to woodlots or wooded wetlands also are frequently inhabited. From late January through early March, deer often will congregate and seek shelter from wind, deep snow, and cold temperatures in stands of dense

conifers, rhododendron, or mountain laurel ("deer yards"). White-tailed deer are crepuscular, that is, their periods of peak daily activity occur at dawn and dusk, yet they may be active at other times of the day, especially during their November breeding season.

The diet of white-tailed deer is highly variable; they consume an amazing variety of plant materials. In general, preferred foods include buds, stems, and delicate shoots of woody plants and a variety of forbs. However, deer also will eat mast crops (e.g., acorns and other nuts), lichens, or the inner bark of saplings, and occasionally they will scratch for roots or tubers. In residential areas, deer browse on ornamental shrubs and graze in flower beds. Forage and vegetable crops, fruits, and nursery plants are eaten where unprotected and available. Although deer may be color-blind, they see and hear very well, and their sense of smell is especially well-developed. Deer, particularly fawns, are an important food of predators, such as coyotes, bobcats, or bears, and scavengers.

Although deer usually do not establish or defend territories, they do maintain a loose social structure. Typically, an adult doe, her fawns, and, in some cases, last year's female offspring stay together on the maternal range, an area of familiar habitat less than 1 mi² (2.6 km²) in size. Males leave the maternal range as yearlings (1+ year old) to adopt either a solitary existence or, more commonly, form "buck groups" consisting of 2-5 individuals. Bucks traverse more area than females, but neither sex travels great distances. Typically New England white-tails travel no more than 5-15 miles except when they retreat to winter "yards", when movements may exceed 15 miles. In the Northeast, breeding occurs from mid-November in northern New England to early December in southern New England. After a gestation period of about 200 days, fawns are born in May or June. Depending upon her age and physical condition, a doe may produce 1, 2, or, rarely, 3 fawns that weigh about 4-6 lbs. (2-3 kg.) at birth and are able to walk about within an hour of birth.

ECONOMIC STATUS AND IMPORTANCE

The white-tailed deer is the most prized big game animal of the Northeast, both for its consumptive value to hunters and for its aesthetic appeal to nature enthusiasts. Considerable income (more than \$100 million in New England) is derived from the sale of licences and sporting equipment and from tourist dollars spent in pursuit of deer. Deer also can produce significant economic hardship for orchardists, vegetable producers, Christmas tree growers, foresters, watershed managers, and homeowners as a result of the damage caused by their feeding. Deer serve as a host for the deer tick (*Ixodes dammini*), which has been implicated in the spread of Lyme disease.

CONTROL TECHNIQUES

How can you determine if deer are present on your property and possibly causing damage? Direct observation of deer, discovering their tracks or droppings, or finding evidence of browsing are good indicators. Because deer do not have incisors (front teeth) on their upper jaw,

they tear or rip away plant material when browsing and leave jagged edges on the remaining stalk or stem.

Many damage control techniques must be implemented before a feeding pattern develops or damage occurs if they are to be successful; once a pattern has become established, it can be difficult to alter. In addition, damage caused by deer is easier to minimize where deer numbers are low. In areas of high deer density and extensive browsing pressure, many deterrents may be ineffective. However, using several different control strategies in an integrated approach will increase the effectiveness of a damage management program.

Preventive Measures

Removal of food or elimination of cover have been suggested as means to limit deer damage. However, evidence to support the success of these techniques is scant. **Planting vegetation unpalatable to deer** may reduce the likelihood of damage, particularly for ornamental plants around residential dwellings. Use of **decoy crops or alternative preferred foods**, such as clover, alfalfa, or lespedeza, placed near or around high value crops may reduce deer damage initially, but also may artificially increase deer densities in the immediate area, leading to greater damage later.

Non-Lethal Controls

Frightening or scare devices (i.e., using noise, visual, or both cues) may provide temporary protection against browsing by deer when used in conjunction with other deterrents and when moved about frequently. Use of certain **noise makers** (e.g., propane exploders, cracker shells) may be restricted by local statutes--check applicable regulations before using any noise deterrent. **Repellents** can provide satisfactory protection to non-bearing crops or dormant season growth in areas where deer numbers are low or browsing damage is light to moderate; repellents usually are not effective where deer densities are high. An **area repellent** prevents deer from entering a site by presenting an offensive odor,

whereas a **taste repellent** applied to a potential food source makes that item less palatable to deer. The effectiveness of all repellents decreases over time and with repeated rains; therefore, most have to be reapplied frequently. **Sterilization and birth suppressants** have received considerable public attention and are the subject of current research. However, an appropriate chemical delivery mechanism that ensures reaching enough individuals to provide adequate population control has yet to be developed. By far the most effective non-lethal technique is the use of either **permanent or temporary electric or non-electric fencing**. The construction, placement, and type of fencing to be used is dependent upon many factors; property owners and producers are advised to consult with their local extension agent or state wildlife professional.

Lethal Controls

The goal of most state wildlife agencies with regard to deer is to achieve a balance between the **biological carrying capacity** (maximum number of deer a habitat can support in good physical condition over an extended period of time) and the **cultural carrying capacity** (maximum number of deer that can coexist compatibly with local human populations). This balance normally is achieved by regulated public hunting, including the harvest of female deer, or special damage abatement permits. Also, regulations exist in many states that allow property owners to remove deer caught in the act of destroying crops, regardless of the time of year.

Notification of appropriate wildlife authorities is required and, in most cases, any animals taken must be surrendered to a wildlife agent. There are **no toxicants or fumigants** registered for the control of white-tailed deer.

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Illustrations prepared by Nancy Haver.

This leaflet was a cooperative effort of the following agencies and institutions:

- Maine Department of Agriculture
- Maine Department of Inland Fisheries and Wildlife
- University of Maine Cooperative Extension
- Massachusetts Division of Fisheries and Wildlife
- University of Massachusetts Cooperative Extension System
- University of Massachusetts, Department of Forestry and Wildlife Management
- New Hampshire Fish and Game Department
- University of New Hampshire Cooperative Extension
- Vermont Fish and Wildlife Department
- University of Vermont, Fisheries and Wildlife Program
- US Department of Agriculture, Animal, Plant, Health Inspection Service, Animal Damage Control (APHIS-ADC) for Maine, Massachusetts, and New Hampshire/Vermont.

For additional information, contact:

CR281:12/91-5M

COMMONWEALTH OF MASSACHUSETTS
DIVISION OF FISHERIES AND WILDLIFE

CONTROL OF ANIMAL ODORS WITH NEUTROLEUM ALPHA

Noxious animal odors may be masked effectively using the deodorant "Neutroleum Alpha". Odors arising from penned animals, as in a laboratory or kennel, skunk spray contamination, or a rotting carcass are examples of odor problems controlled by Neutroleum Alpha.

Neutroleum Alpha is available in concentrated or water soluble form. The water soluble form is cheaper and more flexible in use than the concentrate. The water soluble form can be diluted for use as an area spray or used as is by saturating materials such as cotton or lamp wick. For an area spray, add two ounces of Neutroleum Alpha to one gallon of warm water.

Space or area sprays should be used in a room or small building where the odor-causing substances are widespread or bulky. An area contaminated with skunk spray or where highly odoriferous material has been spilled would be likely places for spray application. The entire area or odor-causing mass should be covered thoroughly with the spray. Generally, one application is sufficient. Sometimes, due to the depth of the odor-causing material, a second application is needed. The interval between applications is usually fourteen days.

Saturated cotton balls or lamp wick may be employed where the source of the odor is localized. The saturated materials should be suspended in or near the contaminated area so that air circulation can move the volatile deodorant throughout the area. The saturated materials can be suspended by string behind doors, from door knobs, behind curtains, from curtain rods, from pipes, or from strategically placed thumb tacks. The saturated materials are effective for about three weeks.

The source of odors is sometimes difficult to locate, especially when small animals die in walls and other out-of-the-way places. Lack of knowledge of air circulation in the area contributes to the difficulty. The smoke of a burning cigarette or punk will show the air circulation in the affected areas. The vicinity of electrical wall outlets and radiator pipes should be checked carefully as these areas usually have a continuous air current. Gases from decomposing animal carcasses are heavier than

air and settle into the lower levels in a structure. It is in these areas that the greatest number of saturated materials should be placed.

The normal number of placements of saturated materials in an average room in a house is four. The number should be doubled in the basement beneath the same-sized room.

Neutroleum Alpha may be obtained from Fritzsche Brothers, Inc., Port Authority Building, 76 Ninth Avenue, New York, N.Y. Inquiries concerning current prices should be directed to the company. This deodorant may also be purchased from hospital supply houses or pest control operators.

Obnoxious odors may also be masked using NI-712, a commercial citrus odor eliminator available as an aerosol spray. This substance is available from Neutron Industries, Inc., 7107 N. Black Canyon Hwy., Phoenix, AZ 85021.

The above is for the information of correspondents. The inclusion of company or trade names does not imply endorsement by the Commonwealth or the Federal government.

Adapted from a leaflet originally prepared by the U.S. Fish and Wildlife Service (1969).

University of Massachusetts,
United States Department of Agriculture and County Extension Services cooperating

Wildlife in Massachusetts

Chipmunk

Chipmunks are small ground-dwelling squirrels common in forested areas of Massachusetts. They have characteristic markings that make them easy to distinguish from other members of the squirrel family. Their coat is rusty-red to chestnut-brown, and has five dark-brown stripes lining the back. Their tail, which is about one-third of the chipmunk's total length, is flat, hairy, and fringed in white or gray. Both males and females are alike in color, size (8-1/2 to 9-1/2 inches), and weight (2-1/2 to 4 ounces). Their short front feet are specially designed for holding and eating food while sitting up. Like all members of the rodent family (squirrels, beavers, mice), chipmunks have chisel-shaped, ever-growing front teeth which must be controlled by gnawing.

Habitat and Behavior

Chipmunks prefer hardwood forests having a thick ground vegetation interspersed with old logs or stone walls. In open areas with little or no ground cover, they are most often found living in the cracks and crevices of stone walls or ground burrows. These energetic and resourceful animals are often seen in parks, lawns, and around gardens.

Chipmunks may seem to be more common than other members of the order *Rodentia* because they are active during the daytime. They seem however, to be most active in the cooler hours of morning and afternoon. When temperatures are too high or low, or the weather is stormy, they will not venture from cover.

When not busy with food gathering or territorial defense, chipmunks sleep in their underground burrows. Burrow entrances are neat, round holes, usually less than two inches in diameter. During the

winter, the entrance is plugged. From the entrance, the burrow drops straight down for a few inches and then declines more gradually until it levels out at about three feet below the surface. When excavating, the chipmunk will carry soil away from the entrance in its cheek pouches. Because of this, there is little or no evidence of excavated soil at the entrance. Within four to five years an average chipmunk burrow may be 30 feet long, have several openings, and may have up to six chambers.

Chipmunks are not true hibernators, though some may sleep for long periods of time during the cold winter months. They store food rather than fat, and must wake up to eat. Mild winter weather may bring them out of their dens for short periods of time.

In late February and early March, chipmunks leave their burrows to breed. There are two breeding seasons every year: spring and summer. During the spring season, the older females and one-year-old females will breed. During late July and Au-

gust, females which do not mate in spring and a few of the three-month-old females will breed. Older females may even have two litters per year. After a 31-day gestation, four or five young are born (blind and naked). The young develop and grow very quickly, spending only a month in the burrow.

Chipmunks are omnivorous, feeding on both plants and animals. Some of the plant foods eaten are acorns, beechnuts, seeds of woody plants, berries of the American yew, ragweed, wintergreen, Canada Mayflower, clover, and wild buckwheat. Occasionally they sample mushrooms, sunflower seeds, watermelon, apples, and squash. They eat many invertebrate animals such as insects and

worms, but sometimes catch vertebrate animals (moles, young mice, small songbirds, and frogs). Chipmunks have special internal cheek pouches which can be filled with food. The pouches are used to carry food to storage sites for future use during the winter and are emptied by squeezing them with their front feet. But, more often they eat their food on the spot, usually at a favorite stump or rock. Such a feeding area rapidly becomes littered with broken nut shells and seeds. During the late summer and early fall, chipmunks start gathering and storing nuts and other seeds for the winter.

Chipmunks usually do not travel very far — 75 yards from their burrow or nest would be consid-

ered a great distance. The outer areas of an individual's home range often overlap with that of other chipmunks, except during the breeding season. Chipmunks are solitary and except for females with young, live alone in separate dens. Predators of chipmunks include: man, hawks, mink, raccoons, weasels, martens, foxes, bobcats, coyotes, cats, and large snakes.

Economic Importance

In their natural habitat, chipmunks are part of the natural community of plants and animals. They compete with gray and red squirrels, grouse, deer, turkeys, mice, and other nut-eating animals for food. Some food is eaten on the spot; some is buried. When a large amount of food is stored and left in the ground, there may be less for other wildlife but some stored seeds can sprout and new trees will grow from them.

Chipmunks are enjoyable to watch, but when they move into urban settings, they may conflict with man's interests. They dig up garden seeds and have been accused of eating flower bulbs. Burrow entrances in lawns, rock gardens, stone walls, and near building foundations may be objectionable. If such disturbances can be tolerated, it may be just as well to learn to enjoy these alert animals. Maybe the benefits of watching outweigh the disadvantages. If control is necessary, such as when they get into houses, snap-type rat traps can be used effectively.

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Illustrations by Nancy Haver.

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Controlling Wildlife Damage

Woodchuck

The woodchuck is a member of the rodent family and is one of the most common mammals in Massachusetts. It prefers to inhabit pastures and meadows or the edges of brush woodlands. Complex burrows are dug and are used for denning and winter hibernation.

Woodchucks are most active during daylight hours and prefer to feed in the early morning or evening. They are vegetarians, and eat alfalfa, clover, grasses, leaves, dandelion buds, common chickweed, and other wild plants as well as agricultural plants such as beans, peas, carrots, and apples.

Control

Abandoned woodchuck burrows offer considerable benefits to many wildlife species. They provide escape cover and dens for cottontail rabbits, foxes, and other wildlife. However, in areas where they are overabundant, woodchuck activities may conflict with man's interests, especially on farms, in gardens, orchards, or nurseries. They can do heavy damage to pea, bean, corn, and hay crops. Mounds of earth from the burrow or entrance holes may be a hazard to farm equipment as well as to horses and their riders. In spring, fruit trees and ornamental shrubs may be damaged by the woodchuck gnawing on the stems. For these reasons, control measures may be necessary.

Fencing

Home gardens may be fenced to keep many animals from damaging or destroying produce. Since woodchucks are good climbers, they can easily scale wire fences. If fencing is already in place, an electric hot wire placed 5 to 6 inches off the ground and about 3 to 4 inches outside the fence will prevent woodchucks from climbing or burrowing under the wire mesh. Also, 4 to 6 inches of a fence should be buried to inhibit burrowing.

Shooting

In Massachusetts, the woodchuck is considered a nuisance animal. A valid state hunting license is required. There is no closed season, nor is there any limit on the number of woodchucks that can

be taken by an individual hunter. Landowners and their hunting friends can help reduce the number of woodchucks where necessary and desirable.

Gassing

If safety requirements do not permit shooting, commercial woodchuck gas cartridges may be used. These are specially designed cardboard cylinders

filled with slow-burning chemicals which, when ignited and put in the burrow, burn to produce carbon monoxide gas. When confined to the burrow system (by blocking the entrances), lethal amounts of gas accumulate. Since a burning material is involved, care should be taken to avoid setting fire to dry grass or brush. Because of the potential hazard from fire and toxic gasses, gas cartridges should not be used in dens found under sheds or buildings. Woodchuck cartridges are available from local farm supply stores. Directions for their use are on the label and should be carefully followed.

Trapping

Trapping may also be used to reduce woodchuck populations in problem situations. A regular box trap made of wood lined with metal to prevent chewing can be used. They should be baited with apples or other fresh fruit and should be checked twice a day (morning and night), so that trapped animals may be dealt with in a humane manner. **Steel leg-hold traps are not allowed in Massachusetts unless trapping in or under buildings or underwater.**

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Wildlife in Massachusetts

Gray Squirrel

The gray squirrel, named for its silvery-gray coat, is a slender, long-tailed arboreal (tree dwelling) rodent. Its bushy, flattened tail is usually held in an S-shaped curve over its body when sitting. Its hind legs are larger and stronger than the front ones and are used for leaping from tree to tree. The front feet are specifically adapted for holding nuts. An adult gray squirrel usually weighs between $\frac{3}{4}$ and $1\frac{3}{4}$ pounds.

Gray squirrels display one of two color phases depending on the season of year. During the winter the underparts are white and the back and sides are made up of hairs banded in black, brown, and black with a white tip. Summer coats may be more yellowish-brown, with gray on the sides of the neck, shoulders, and thighs. Overall, the tail is gray in appearance, but individual tail hairs are brown at the base, banded with black and tan, and tipped with white. Both males and females are similar in color. In certain parts of Massachusetts a totally black color phase is known to occur. Gray as well as black color phases may be found within the same litter.

Gray squirrels can be found throughout Massachusetts, especially where there are hardwood trees such as oak, hickory, and beech. They are common in cities and parks where nut- and fruit-bearing trees are abundant and discarded food is available.

Habitat and Behavior

Gray squirrels are very quick and nimble animals. They can easily run, climb, and jump among branches of the tallest trees. Their long, flattened tail helps them to maintain their balance during these acrobatics. When startled on the ground, squirrels will usually scramble up the nearest trunk, traveling swiftly from tree to tree, seldom losing their grasp. When they jump too far, they can drop from the tree top to the ground without being injured. Squirrels can travel along electrical and telephone wires with ease for long distances without setting foot on the ground.

The gray squirrel uses leaf nests and tree dens. Good tree dens are permanent quarters, while leaf

nest are only temporary homes during summer-time. The animals seem to prefer cavities in mature, living trees for winter dens. A den or cavity begins to form in a tree where a branch has fallen off or where a woodpecker has drilled a hole into the trunk. With the protective bark gone, weather and insects begin the decay process in the wood, and eventually, a cavity is formed. Cavities are created in live trees as well as in dead and dying ones. Squirrels need a den that has an opening measuring approximately three inches. They must often gnaw back new bark tissues that grow over openings to keep the den entrance from sealing. Old hollow trees with broken tips, cracks and many openings do not make good tree dens, but do provide hiding places for squirrels. On occasion, a squirrel may choose to den in a barn, garage, or attic.

During summer, adults build leaf nests which are usually placed in the top fork of a tree or in the crotch of a high limb near the trunk. A single entrance usually faces the main tree trunk or nearest limb. A leaf nest is made up of 3 or 4 parts: the base and supports are constructed of twigs, the floor on the inside is made of a layer of compact soil and organic debris mixed with twigs, and the outer shell is made of leaves and twigs. Often, an inner layer of woven bark, grass, and leaves is constructed to provide warmth and added protection. Leaf nests range in size from 14 to 16 inches in diameter and weigh from 6 to 7 pounds. Such nests are cooler than cavity nests and are free of parasites. They may also serve as temporary quarters near winter food supplies.

Squirrels have two breeding seasons per year: one in late January or February, the other in late May or June. Before mating, several males may chase a female in a noisy, energetic race through tree tops. After a 44-day gestation period, 3 to 5 young are born (blind and hairless). Young squirrels depend on the mother for about 12 weeks. Young from the first litter venture out in early May and those from the second litter become active in early August. Springtime litters are generally born in tree dens, but summer litters are usually born in leaf nests.

Squirrels rely heavily on mast (nut) crops such as acorns, hickory nuts, and beech nuts for food and can consume up to two pounds of nuts each week. When mast is scarce, squirrels may be hard pressed to find enough food to subsist. Food shortages and severe winter weather may reduce populations drastically. When mast is abundant, the animals store (cache) nuts, then throughout the winter they dig them up to eat. Experiments have shown that squirrels find these stored nuts with their highly developed sense of smell. They compete for mast with ruffed grouse, deer, black bear, chipmunks, white-footed mice, blue jays, flying

squirrels, and wild turkeys. During spring thaw, squirrels will eat buds and flowers of red and sugar maple. Later in spring, they may eat the maple and elm fruits. In summer, they feed on berries, mushrooms, apples, corn, and other grains. Gray squirrels will occasionally eat bird eggs and chew on bones or deer antlers for calcium, phosphorous, and other necessary minerals.

Although they may stay in the den for several days at a time during stormy weather, gray squirrels are active all year long. Daily, they are most active at dawn and in late afternoon. If wind is not strong, they will feed during rain or snow storms. Most squirrels live in an area of 2 to 7 acres. Their natural predators are hawks, owls, foxes, bobcats, and raccoons. Also, hunters take some during open season. House cats prey on squirrels, especially young ones. Many are killed on roads in the fall when they tend to migrate longer distances in search of food. The average life span of gray squirrels is about 1-1/2 years, but they have been known to live seven or eight years.

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Wildlife in Massachusetts

Muskrat

The muskrat is one of the larger wild rodents found in Massachusetts; adults weigh from 1-1/2 pounds to 4 pounds. Like its relative the beaver, it is a water-loving mammal. Its fur varies in color from rich dark brown to reddish brown. Its underfur is thick, silky and grayish. Muskrats have large, broad hind feet that are partially webbed and are well adapted for swimming. Unlike the beaver, the muskrat's scaly tail is flattened vertically so it can serve as a rudder while the large hind feet propel the animal through water. Its small, long-clawed front feet are specially adapted for holding food and digging. Muskrats have two scent glands located near the anus, which give off a musky odor that is strongest during the breeding season.

Habitat and Behavior

Muskrats are seldom found far from water. They prefer shallow ponds and marshes, but may occasionally be found along slow-moving streams, canals, and rivers. Muskrats may dig a den in a bank or build a house with aquatic plants. In general, burrow entrances are below water level. A bank den is ventilated by small holes hidden under a pile

of roots or other thick vegetation. When banks are too low for a den, muskrats build a lodge of cattails and other aquatic plants. The lodge may be constructed over a submerged stump or log, or built directly on the bottom of the wetland. The cone-shaped den is made of mounded cattail stalks, or bulrushes, roots, and mud dragged up from the bottom. Entrance to a lodge is always under water but the living chambers are above water. Interior rooms are protected by walls of vegetation and mud that are more than a foot thick and are lined with fine grasses. Muskrats will continue to build throughout the year. New houses appearing in late summer are usually the work of young muskrats. The tops of muskrat lodges are favorite nesting platforms for Canada geese and other water fowl.

Even though they are chiefly nocturnal, muskrats occasionally venture out during the day. Since they are mostly vegetarian, they feed on stems, roots, bulbs and leaves of aquatic plants; however, they may also feed on corn, clover, alfalfa, apples or other fruits. They also eat snails, mussels, crustaceans, insects, and fish. When feeding, a muskrat prefers to take its food out into the wetland

to an emerged floating log. There uneaten food soon piles up and forms a feeding platform. These "feeders" are places where they can eat without interference from predators. Because they are roofed, the feeders can safely shelter a muskrat during bad weather. In ponds or marshes which are likely to freeze over in the winter, muskrats often keep open under-the-ice access tunnels leading from the lodge to favorite feeding places.

Muskrats in Massachusetts breed from early spring until fall. In the south they may breed almost year-round. Usually three to five litters of 5 kits are born to a breeding female each season. Young muskrats are born hairless and helpless, but they grow very rapidly and are independent from the mother in only one month. Some young may even breed within the same year in which they were born.

Economic Importance

Originally found only in North America, the muskrat has been transplanted to Europe and other parts of the world. Muskrats are one of the most important furbearing animals in Massachusetts, as in most other states. Muskrats are regulated as furbearers and the harvest is strictly controlled under Massachusetts laws. Natural enemies include coyotes, skunks, weasels, bobcats, great horned owls, marsh hawks, red foxes, mink, snapping turtles, and large snakes.

Muskrats often cause damage to earthen dams and dikes by burrowing into the banks. Their feeding habits sometimes result in damage to agricultural or ornamental crops growing near water.

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Wildlife in Massachusetts

Raccoon

instances. Their feet are well adapted to climbing. Their forepaws are very sensitive to touch and they often stop to feel around in water as they wander along a stream in search of food.

Habitat and Behavior

Raccoons live in forested areas that are close to fields or wetlands. They are often found near streams, lakes, and swamps, but are very adaptable and can exist in almost every sort of habitat where food is available, including suburban areas. They den in hollow trees or logs, rock crevices, deserted buildings, culverts, abandoned beaver lodges, or woodchuck burrows. More than one den may be used each year and the same den is often used year after year.

Raccoons are almost entirely nocturnal, but are most often seen at dawn or dusk. Although they spend winter months denning up, they are not true hibernators and may leave the den during winter warm spells. Raccoons do not store food like chipmunks, but they build up layers of body fat which are used to supply energy until spring.

Although classified as a carnivore, raccoons feed on a wide variety of plants and animals including frogs, fish, shellfish, insects, birds, nuts, fruits, seeds, corn, and other vegetables. In spring they feed mostly on animal matter, and in late summer, fall, and winter, they feed mainly on plants and seeds. Some favorite plant foods include apples, acorns, corn, oats, berries, grapes, ragweed, and

Distribution and Identification

The raccoon is common throughout Massachusetts and most of North America. Raccoons are recognized by their black face mask and black, brown, and white ringed bushy tail. They have long thick fur, a wide head, and a slender, pointed nose. The coat is a grizzled gray or brown. Male and females are colored alike, and males are generally larger than females. Adults average between 8 and 16 pounds, but may get up to 40 pounds in rare

tender shoots and buds. Animals commonly eaten include crayfish, frogs, snails, fish, snakes, insects, small birds and their eggs, shrews, mice, and carrion. In urban areas they frequently raid garbage and rubbish containers.

Most raccoons breed during January, February or March. The young are born about 63 days later. Litters of 3 to 7 cubs are born blind, but with fur. The cubs grow rapidly and open their eyes when they are about three weeks old. The mother and young remain together throughout the summer and may den together during the following winter.

Raccoons have few natural predators because of their relatively large size and their fighting and climbing abilities. While young raccoons are sometimes killed by owls, foxes, and weasels, man and dogs are the major predators of adults. Many raccoons are killed on roads each year and many young die from starvation, disease, and parasites during the winter. Hunting and trapping are strictly regulated to insure that only the surplus population is harvested each year.

Economic Importance

Raccoons are important furbearers and game animals. They are hunted and trapped for their fur, for meat and for sport. They fill an ecological niche as a predator, thereby helping to regulate rodent and other pest populations.

Control

Raccoons cause damage in corn fields by feeding on ears of corn and they occasionally kill poultry and eat eggs. Often they damage fleshy fruit and vegetables in gardens. They are also a nuisance when they get into garbage at camp sites or elsewhere, and may enter chimneys. Many of these problems would be easily avoided if people would keep their garbage in secure cans and block access to potential den sites in buildings. Raccoons have also caused problems for other wildlife. Initially, the wood duck nesting box program was seriously hampered because raccoons preyed upon eggs and hens sitting in the boxes. Today, the nesting boxes are fitted with a wooden extension or metal barrier that prevents the raccoon from reaching into or climbing up to the box.

Before initiating any control program, contact the Massachusetts Division of Fisheries and Wildlife or a U. S. Fish and Wildlife Service representative. Control measures can be either "reductional" or "preventive." Reductional methods include killing the offending individuals. Preventive measures include installation of electric fences of 6-foot high wire that surround the area to be protected. Also, garbage cans should be secured. Although the State Division of Fisheries and Wildlife can not get rid of the raccoons for you, it can supply trapping regula-

tions, directions for building inexpensive live traps, and instructions for capturing the nuisance animals. Since most raccoon problems are caused by a few individuals, controlling these troublesome raccoons will usually solve most of the problems.

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Controlling Wildlife Damage

Raccoon

during the winter. They feed on many animals and plants including frogs, fish, crayfish, insects, birds, nuts, corn, and other vegetables. They also eat carrion and garbage.

They live in hollow trees or logs, rock crevices, deserted or inhabited buildings or in deserted woodchuck burrows. Their breeding season is from January to mid-March. After a 63 day gestation, 3 to 7 cubs are born in the dens. The young begin foraging for food by 2 months old and stay with the female through the following winter.

Raccoons are important furbearers and game animals, and this classification provides them with legal protection. They cannot be taken except during the hunting or trapping seasons. Raccoons fill an ecological niche as a predator. They may help regulate rodent and other pest populations.

Control

Raccoons can cause damage in corn fields, gardens and orchards. They feed on ears of corn, garden vegetables, fruits, and raid garbage cans. Many of the most trying raccoon problems in Massachusetts are in suburban areas: raccoons in chimneys, attics or garbage containers. Since individual animals do most of the damage, controlling these few troublesome raccoons will usually solve most of the problems. The Massachusetts Division of Fisheries and Wildlife should be contacted before any control program is started.

Raccoons live throughout Massachusetts, except in Nantucket. They are most common in forests and wet areas such as streams, lakes or swamps. They are recognized by their black face masks and black, brown and white ringed bush tails. Adults grow to about 28 to 36 inches long, including the tail, and can weigh up to 40 pounds.

Raccoons are nocturnal, and while they do not hibernate, they may be inactive for long periods

Hunting

Hunting may help keep animal numbers and damage at a tolerable level. Before hunting, permission should be granted and ground rules set between the hunter and the landowner. When hunting raccoons, a valid state hunting license is required during legal hunting season. If it is necessary to shoot out of season those animals doing damage to private property, your local state conservation officer should be consulted. It is permissible to destroy raccoons on your own land if they are doing damage, but no shooting may be done within 500 feet of an inhabited dwelling or within 150 feet of a state wood. No license is needed if shooting is done by the landowner, a member of the immediate family or a tenant.

Preventing Damage

Electric fencing can be used around gardens to protect crops from raccoons. Two electric wires placed 5 to 8 inches above the ground and powered by a fence charger will stop animals from entering vegetable plots. Care should be taken to examine wires frequently and support stakes to make sure vegetation doesn't grow up and short out the fence. Support stakes can be made inexpensively out of 1" x 3" strapping material. These supports, with insulators, can be driven into the ground at 10-foot intervals.

Keeping very tight-fitting covers on garbage cans around camps and homes, and keeping the garbage area clean and odor-free will usually prevent raccoons from becoming a nuisance. You can also keep garbage cans inside a closed garage or keep garbage in the freezer and only place it in trash containers on the day of pickup.

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Wildlife in Massachusetts

Striped Skunks

The striped skunk is probably best known for its pungent odor. It is very common throughout Massachusetts where it is also known as the eastern striped skunk, polecat, wood pussy, common skunk and lined skunk.

Striped skunks are about the same size as house cats, but with shorter legs. Their front feet have long, curved claws that are used for digging in grass and pulling apart rotten logs in search of insects. Skunks can be easily recognized by their broad white stripes running from the nape of the neck to the base of the tail. There is also a single white stripe between their eyes. While males and females look alike, males are somewhat larger. An adult male may weigh from 6 to 14 pounds and measure about 20 to 28 inches long.

Habitat and Behavior

The skunk belongs to the weasel family (Mustelidae). Like other mustelids they have scent glands located near the anal opening which are used for

protection. By lifting their tail over their arched back and contracting the muscles near the gland, a skunk can spray its yellowish, musky fluid accurately as far as 12 feet. Warning signals such as rapid stamping of the front feet and arched back or lifted tail are signs that a skunk is ready to spray. Skunks will usually not spray unless they are very frightened or upset.

Skunks inhabit a variety of habitat types, especially mixed woodlands that are close to open fields or agricultural lands. Though mostly nocturnal, they may be seen at dawn or dusk, and occasionally even in late afternoon. They search for food along woodland-field borders, fence rows, marshes, and stream edges. Although they can swim, they prefer to stay out of the water.

In spring, skunks feed on mice, snakes, and insect larvae. Later in the summer, grasshoppers

crickets, earthworms, and beetles are eaten. As insects become scarce in the fall, they eat a variety of small mammals including mice, shrews, moles, and chipmunks. Apples, raspberries, black berries and other fruit are also important in their diets. In more wooded areas, skunks will eat eggs and nestlings of ground-nesting birds. Where available, they will also feed on frogs and crayfish. Because they have such a varied diet, their chance of surviving during times of food shortages is high.

During the day, skunks sleep in dens or burrows located under stone walls or in abandoned woodchuck holes. They like denning on sunny slopes, but in populated areas burrows are often hidden under buildings, wood piles, or stone walls. Although skunks are not true hibernators, they go into a deep sleep in late fall or early winter. They may, however, wake up during winter thaws. During most of the year, skunks keep to themselves, but as many as ten or more may den together in the winter.

By early March, skunks leave their dens to breed. A single litter of about 4 to 7 young is born in mid-May after a 62-66 day gestation period. Young skunks are born blind and helpless, and are weaned after 2 months. They may stay with their mother through their first winter. The kits are able to spray like an adult by the time they are 4 or 5 weeks old.

Skunks have few natural enemies. One encounter with the irritating, eye-burning musk is usually enough to keep most predators away. However, skunks are preyed upon by man, great-horned owls, bobcats, foxes, fishers, lynxes, and coyotes.

Economic Importance

Skunks are generally beneficial to farmers, gardeners, and landowners because they prey on field mice, other small mammals, and insects. Occasionally, they feed on corn, poultry, and eggs, a habit which conflicts with man's interests. They sometimes damage beehives when searching for insects. Probably the most common complaint is of skunks getting into basements, barns, garages, and under porches. Skunks that are active during the day are

often suspected of having rabies; therefore, precautions should be taken to avoid them. If an individual is bitten, the wound should be cleaned immediately with soap and water, and a doctor should be contacted soon afterwards. If possible, a skunk suspected of being rabid should be captured without damaging the head, so the brain tissue can be examined for rabies. Carcasses of these animals should be sent or taken to a state public laboratory. While nuisance skunks may be captured according to state wildlife regulations, it is illegal to keep skunks as pets.

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Controlling Wildlife Damage

Skunks

Skunks forage for food at night, seeking grubs, insects, small rodents, carrion, soft fruit, berries, corn, and mushrooms. Occasionally, they eat eggs and nestlings of ground-nesting birds and poultry. Skunks generally make their dens in abandoned woodchuck holes or in rock piles or under buildings and wood piles. They are not true hibernators but go into a state of dormancy during periods of cold weather, waking when temperatures rise. Their breeding season is in late February and early March.

Skunks are basically beneficial to man because they prey on many small rodents and objectionable insects. However, they become a nuisance by occasionally feeding on corn, poultry and eggs. They will take one chicken at a time, but then usually return for more. Since skunks do not climb well, predation is limited to poultry and eggs in nests near or on the ground. If many chickens are killed and nests above the ground are destroyed, rats, weasels or mink are more likely suspects. Beehives

may also be damaged by skunks in search of insects. Skunks may dig up lawns, golf courses, and meadows in search of beetle larvae and other grubs. The diggings appear as patches of upturned earth and turf, 3 to 4 inches across, funnel-like in appearance, and usually 3 to 4 inches in depth. Since other animals such as moles, squirrels and dogs dig up lawns, it should be determined precisely which species is causing the problem before control measures are attempted. Moles tunnel below the ground surface and leave ridges or mounds of dirt in the grass with no visible evidence of burrow openings. Squirrels may make small shallow excavations while burying or removing nuts. Dogs may bury or remove bones.

Skunks sometimes are carriers of diseases that are harmful to humans and domesticated animals. Such diseases include rabies, distemper and leptospirosis. Diseased skunks may sometimes be identi-

fied by behavior that is unusual for the species such as appearing during daylight hours, erratic wandering or loss of coordination and unusually aggressive behavior. If an animal is seen and suspected to be diseased, it should be reported to a local conservation officer or to the police. It is unwise for persons untrained in handling diseased animals to attempt capturing, killing or removing them.

Control

Skunks are generally beneficial; therefore, control should, where possible, be preventive rather than destructive (killing the animal). Skunks that den under buildings may become a nuisance. Although they rarely spray in their dens, they do emit a musky odor which may be objectionable. When skunks are out, openings in foundations can be sealed off using welded wire fencing, sheet metal, concrete, or other suitable materials. If skunk activity is suspected, flour or ground limestone can be sprinkled in front of the opening and checked after dark for tracks. If there are signs of activity, the direction of the tracks will indicate if the skunk has left the den. The opening can then be sealed. Caution should be used when closing entrances between early May and mid-August to avoid trapping young inside. When skunks enter garages, cellars or houses, doors should be left open to allow the skunk to leave. If the skunk does not leave on its own, a live trap baited with sardines or canned cat food can be used. Cover the trap, except for the entrance, with a burlap sack at the time it is set, so the skunk can be easily moved to a more desirable location without fear of spraying. The animal can be released from the trap by carefully placing the trap on the ground and slowly opening it so the skunk can walk out. **Note!** Permission must be obtained from the Massachusetts Division of Fisheries and Wildlife to live trap skunks.

In most instances, food from uncovered garbage containers or dog dishes attracts skunks to buildings. The use of secure lids on containers will usually solve this problem. It is wise to keep doors to poultry coops closed at night. A 3-foot high fence of 2-inch wire mesh with 2 feet above and 1 foot below the ground surface will keep skunks out.

Written and compiled by Nan Chadwick.
Illustrations by Nancy Haver.

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Trapping

Wooden box traps or commercial wire-mesh traps covered with burlap bags are very effective.

Because skunks are classified as furbearers in Massachusetts, trapping them can only be done from November to February. All traps used on someone else's land must have a valid registration number permanently embedded or cut into the trap. A current valid trap registration certificate and a valid trapping license is required of all who trap on someone else's property. Steel jaw leg-hold traps may be used only in or under buildings on land owned, leased, or rented by the trapper.

Skunk musk is very irritating to mucous membranes. Temporary intense pain and burning may be caused by contact with lips, eyes, and nasal passages. Diluted solutions of vinegar or tomato juice helps in removing skunk odor from people, pets and clothing. Neutroleum Alpha, an aromatic, is effective when placed in basements or garages. This material might be obtained from some hospital supply houses or pest control firms.

Here are some of the answers that we give to people with questions about young wildlife:

Q A baby bird has fallen out of its nest in a tree in my backyard. I am afraid something might happen to it if I leave it there on the ground. Should I bring it into the house and feed it until it is able to fly?

A No. The best thing to do is put the bird carefully back into the nest. Don't worry about getting your scent on the bird; it should not affect the mother's care. Even if you find that the nest has blown out of the tree, put it back in the tree securely along with the nestling.

Q A few minutes ago I was walking through the woods behind our house and saw several baby raccoons on the ground near a large hollow tree. I wonder if they fell out of the hole way up in the tree and the mother has abandoned them because she can't put them back in the nest. Should I bring them home and care for them?

A No. Most likely the young raccoons are merely exploring, and their mother is nearby. They are probably old enough to be fully capable of climbing back up the tree to their den when they are ready to return. If they were too young to climb, the mother would carry them back.

Q There is a young bluejay in my backyard and it seems to have difficulty flying. I am afraid that either my dog or cat will get it. Should I bring it inside and feed it until it is able to fly?

A No. As a fledgling, it had enough feathers to leave the nest. This means it is old enough to learn to fly, which it will rapidly begin to do. Leave the bird alone, but you should keep your dog and cat in the house

for a few days so that they will not disturb the bird.

Q This morning I found an abandoned fawn near the edge of a field on my property. I brought the fawn into my house to save it, but I don't know how to care for it. What should I do?

A Immediately, take the fawn back to the spot where you found it, and leave it there. The mother should come back again looking for the fawn. Even one or two days after removal from the wild, fawns have been successfully reunited with their mothers by returning them to the place where they were found. When you picked up the fawn, the mother was probably feeding not far away. Usually young fawns are quite safe when left alone because their color pattern and lack of scent help them to remain undetected until their mothers return.

Q A moment ago, I accidentally kicked open a nest of baby rabbits while walking in the thick grass at the far corner of my backyard. They seem so helpless. I waited, but saw no sign of their mother. Should I rescue them?

A They do not need to be rescued. The mother would not return as long as you remained at the nest. Just replace the top of the nest that you uncovered and leave. The mother will return and care for the young. Cottontail rabbits leave their young for hours while eating, but they do return to nurse the young. As with other young wildlife, it is best to **LEAVE THEM ALONE!**

IF YOU CARE...

**LEAVE THEM
THERE!**

**YOUNG WILDLIFE
BELONGS IN THE WILD**

Commonwealth of Massachusetts
Division of Fisheries & Wildlife

University of Massachusetts
Cooperative Extension System

University of Massachusetts, U.S. Department of Agriculture and Massachusetts counties cooperating. The Commonwealth of Massachusetts Division of Fisheries & Wildlife and the UMass Cooperative Extension System offer equal opportunities in programs and employment.

THE PROBLEM

Every year, the lives of many young wildlife are upset by people who only mean to help. These people take *baby* wildlife from the wild with the mistaken belief that they are *saving* them. Hopefully, a little understanding will prevent this problem.

WHY IT OCCURS

The arrival of spring and summer also means the arrival of newborn and just-hatched wildlife. These youngsters soon venture into the world on shaky legs or fragile wings. Most are learning survival from one or both parents. For them, the perils of survival are a natural part of ecology. Some will not survive. However, young wildlife that learn well and are the most fit usually live the longest.

Those early unsteady steps and flights are part of normal development, helping young animals learn to take care of themselves. Some develop that ability quickly, almost from birth. Varying hare, for example, are ready to venture into their world within hours. Other animals need more parental care. Cottontail rabbits are born with no fur and eyes closed, unable to leave their nest for several days.

It is at this time that most of the problems arise. Some people assume that young wildlife they have found are *abandoned*. They believe that the young animals are helpless and need to be *saved*. *In nearly all cases, this is a mistake*: the young animals are neither abandoned nor orphaned.

THE RESULT

These well-meant acts of kindness tend to have the opposite result. Instead of being left to learn their place in the world, young wildlife are removed from the wild. They are denied important natural learning experiences. Worse, most people quickly find that they do not really know how to care for young wildlife, and many of the animals soon die. In the end, the well-meant people's efforts can be prevented if young

wildlife are not taken from the wild in the first place.

Young wildlife that do survive human care have missed the natural experiences that enable them to fend for themselves. When these animals are released back into the wild they have a reduced ability to survive. It is difficult for them to function as they should in the natural world. Their ability to find natural foods is impaired, thereby reducing survival chances. Further, they may be thrust as unwelcome intruders into the home range of another member of their species.

Often, the care given to young wildlife unavoidably results in some attachment to humans. Upon release to the wild, those animals generally have little fear of people. Some return to places where people live, only to be attacked by domestic animals or to be hit by cars. Some become nuisances getting into stored food, trash cans or dwellings. People have also been injured by once-tamed wildlife.

WHAT TO DO

All of these problems can be avoided if we follow one simple rule when coming upon young wildlife: **LEAVE THEM ALONE!** It may be difficult to do, but this is the real act of kindness. We must not allow ourselves to be fooled into thinking that the situation is different - in nearly all cases, young wildlife do not need to be saved. *Resist the temptation to help them.* Only when they are found injured or with their dead mother is there reason to do something, and then the state wildlife laws are specific about what may be done legally.

Nearly all wild birds and mammals are protected under the law. They may not legally be taken from the wild or kept. Never consider them as possible pets; it is both illegal and unwise. They are wild animals that belong in

the wild. However, a distressed/injured wild animal may be assisted, but a person must deliver the animal immediately to a licensed wildlife rehabilitator, to an office of the Division of Fisheries & Wildlife, or to an Environmental Police Officer.

The Division of Fisheries & Wildlife licenses wildlife rehabilitators who are qualified to care for injured or truly orphaned wildlife. In cases where the services of a wildlife rehabilitator are required, they may be obtained through one of the Division offices:

Central Wildlife District

Temple Street, West Boylston 01583
(508) 835-3607

Northeast Wildlife District

Harris Street, Box 86, Acton 01720
(508) 263-4347

Southeast Wildlife District

195 Bournedale Road, Buzzards Bay 02532
(508) 759-3406

Field Headquarters

Rte. 135, Westboro 01581
(508) 792-7270 or 366-4470

Western Wildlife District

Hubbard Ave., Pittsfield 01201
(413) 447-9789

Connecticut Valley Wildlife District

East Street, Belchertown 01007
(413) 323-7632

Boston Office

Leverett Saltonstall Building
100 Cambridge Street, Boston 02202
(617) 727-3151

MOVING WILD ANIMALS IS AGAINST THE LAW!

Capturing a wild animal and releasing it in another area is prohibited by Massachusetts law. Rabies in raccoons is spreading throughout the eastern United States. Moving animals from one area to another may spread this disease to new areas. To protect people and wildlife,

Do Not Relocate Problem Wildlife!

Wild animals sometimes damage homes, gardens and lawns. Often people want to catch the problem animals and release them someplace else. Massachusetts law prohibits moving any live wild animal from one area to another. This law has been in effect for many years, protecting both humans and wildlife.

Here are some reasons wild animals should not be relocated:

- * Capturing a wild animal and releasing it somewhere else may spread disease(s) into populations of animals (including pets) that did not have the disease(s) previously. Diseases such as Rabies and Canine Distemper have been spread by people who captured an animal in one area and released it somewhere else.
- * Wild animals already live where you release your problem animal. Wherever you plan to release a problem animal, there are already resident animals with established territories competing among themselves for food and denning sites. When a new animal is introduced, competition for these limited resources is intensified, causing increased social stress and conflict within the resident population, as well as hardship or death for the introduced animal.
- * Relocated animals often return to where you caught them. Squirrels, raccoons and other wildlife can return from translocations of 5, 10, or even 15 miles. Such animals are more likely to be killed by automobiles or succumb to other accidents as they cross unfamiliar areas while attempting to return to their original territories.
- * Relocation only transfers your problem to someone else. In an unfamiliar territory, an animal accustomed to living near people is likely to seek out human habitations and damage someone else's property.
- * Moving an animal does not solve the problem. Within a short period of time, other individuals of the same or another species will move in, unless food (garbage, pet food, grain) is removed, and access to gardens, chimneys and attics is blocked.

Information on methods or techniques to control damage caused by wildlife is available by contacting :

Massachusetts Division of Fisheries & Wildlife

Acton 508-263-4347 Bourne 508-759-3406 West Boylston 508-835-3607

Belchertown 413-323-7632 Pittsfield 413-447-9789

PUBLIC HEALTH FACT SHEET

Giardiasis

Massachusetts Department of Public Health, 150 Tremont Street, Boston, MA 02111, (617) 727-0049

What Is Giardiasis?

Giardiasis is a gastrointestinal infection caused by a microscopic parasite called *Giardia lamblia*. This is a common parasite causing gastrointestinal illness in the United States. Giardiasis can be a problem in areas where sanitation is poor, in settings in which there may be problems with personal hygiene, such as institutions or day-care centers, or when unfiltered water supplies are contaminated with the organism.

How Is Giardiasis Spread?

A *Giardia* infection can be acquired when you ingest food or water which has been contaminated with the parasite. The parasite multiplies in the small intestine and is passed out with a bowel movement. Any food or drink which has become contaminated with infected stool can transmit the parasite. The infection can also be spread person-to-person when hands, which are contaminated with an infected person's stool, are brought in contact with the mouth. Swallowing as few as ten parasites can cause the infection. Person-to-person transmission is the main way that giardiasis is spread, such as in day-care centers and institutions, where personal hygiene may be poor due to age (infancy, elderly) or disability. Giardiasis can also be spread in this manner in a household setting.

Are Animals Involved in the Spread of Giardiasis?

Giardia parasites have been found in the stools of many animals, including rodents, dogs, cats, cattle, and wild animals. Animals living near water supplies, such as beavers and muskrats, have been found to be infected with *Giardia*. The extent of direct animal-to-human transmission of *Giardia* is minimal; there is greater evidence of indirect transmission such as through contamination of water supplies.

What Are the Symptoms of Giardiasis?

Symptoms of giardiasis usually appear 7 to 10 days (and sometimes as long as 4 weeks) after ingesting the parasite. The most common symptoms are diarrhea, foul, greasy stools, abdominal cramps, bloating, increased gas, weakness, and weight loss.

Do All People Who Are Infected With *Giardia* Get Sick?

No. Some people who are infected with the parasite may only have minor symptoms and some people may not have any symptoms at all. However, these people can still pass *Giardia* parasites in their stool and become a source of infection for others.

How Is Giardiasis Diagnosed?

Giardiasis is usually diagnosed through a laboratory examination of a stool sample. Your physician will forward the stool sample to a laboratory which will use a microscope to look for the parasite. Several stool samples may need to be examined to detect the parasite. The disease can also be diagnosed through a sample of fluid or a biopsy from the small intestine.

What Is the Treatment for Giardiasis?

There are several medications which are effective in treating the infection. They are only available by prescription from your physician. Other treatments for diarrhea, such as increased fluid intake, may also be recommended by your physician.

How Can Giardiasis Be Prevented?

Giardiasis can be prevented by practicing good hygiene and using caution before drinking water from an unknown source.

Some general guidelines are:

1. Always thoroughly wash your hands with soap and water before meals, before preparing food, after having a bowel movement, after changing diapers, and after playing with your pets.
2. Do not drink untreated water from a surface water supply such as a pond, lake, or stream. Although the water may appear to be clean, it may contain *Giardia* parasites which cannot be seen without a microscope. If only untreated water is available, boil the water before drinking it.
3. If you are taking care of a person with giardiasis, use extra precautions after contact with the person's stool (for example, after changing diapers). Promptly and carefully dispose of any material which has been contaminated with stool and always wash your hands after such contact.
4. If your source of drinking water is from a well or another surface water supply, do not allow humans or animals to defecate (have bowel movements) near the water. In addition, appropriate water filtration systems can be effective in removing *Giardia* parasites from contaminated water.

Are There Any Health Regulations for People With Giardiasis?

Yes. To protect the public, all employees of food-related businesses (restaurants, food storers, food processing plants) who have giardiasis are required by law to be absent from work until they have two consecutive negative stools taken at least 48 hours apart. This law also applies to foodhandlers who are household contacts of a person with giardiasis.

Where Can I Get Further Information?

Massachusetts Department of Public Health

Division of Communicable Disease Control (617) 727-2686
Office of Public Information and Health Education (617) 727-0049

Your Local Board of Health

In phone book under local government.

May 1986

PUBLIC HEALTH FACT SHEET

Lyme Disease

Massachusetts Department of Public Health, 150 Tremont Street, Boston, MA 02111

What is Lyme Disease?

Lyme Disease is an infectious disease caused by bacteria that are spread by tiny infected ticks. Both people and animals can be infected by Lyme tick bites. Lyme Disease can be serious if it is not treated, but it is not fatal.

Where is Lyme Disease found?

Lyme Disease can be found all over the United States, but it is most common along the east coast, the Great Lakes, and the Pacific Northwest.

In Massachusetts, Lyme ticks are most often found in the coastal areas, islands, and the Connecticut River Valley in the western part of the state. The disease is most likely to be spread between late May and early autumn, when ticks are most active.

How is Lyme Disease spread?

Lyme ticks cling to plants near the ground in brushy, wooded, or grassy places. The ticks, which cannot jump or fly, climb onto animals and people who brush against the plants. Very young ticks (called larvae) pick up the bacteria that cause Lyme Disease by biting infected animals, such as field mice. The bite of older ticks (called nymphs) can pass the infection along to the next host.

Lyme ticks are so tiny that the larvae are no bigger than the period at the end of this sentence. The ticks live for two years, during which they can infect wild and domestic animals as well as people.

Not all ticks carry Lyme Disease, and even being bitten by a Lyme tick does not necessarily mean that you will get the disease. The tick must be attached for at least 24 hours to pass on the bacteria, so removing the tick promptly will cut down your chances of becoming infected.

What are the symptoms of Lyme Disease?

Early stage: The first symptom of Lyme Disease is usually — but not always — an unusual rash where the tick bit. (Often the tick isn't even noticed, and it drops off before the rash appears.) The rash first appears anywhere from three days to a month after the bite. It starts as a small red area then spreads out, often clearing up in the center so it looks like a donut. Other skin signs include burning or itching, hives, redness of the cheeks and under the eyes, and swollen eyelids with bloodshot eyes. Flu-like symptoms such as fever, headache, stiff neck, sore and aching muscles and joints, fatigue, sore throat, and swollen glands are also common in the early stage of Lyme Disease.

These symptoms often go away by themselves after a few weeks, but the person remains infected. Without medical treatment, about half the infected people will get the rash again in other places on their bodies, and many will develop more serious problems later. Treatment with antibiotics clears up the rash within days and often prevents later problems.

Later stages: Three major organ systems — the joints, nerves, and heart — can be affected months after the tick bite, although symptoms usually show up within four to six weeks. People with Lyme Disease can develop late-stage symptoms even if they never got the donut-shaped rash.

About 60% of people with untreated Lyme Disease get arthritis in their large joints, usually knees, elbows, and wrists. The arthritis can move from joint to joint and become chronic.

About 10% to 20% of people who don't get treatment develop nerve problems. The most common symptoms are severe headache and stiff neck, facial paralysis or other cranial nerve palsies, and weakness or pain (or both) in their hands, arms, feet and/or legs. These symptoms can last for weeks, often shifting from mild to severe and back again.

About 6% to 10% of people who don't get treatment develop heart problems, such as inflamed heart muscles or erratic heart beats.

How is Lyme Disease diagnosed?

Lyme Disease is easy to diagnose when someone gets the donut-shaped rash. It is much harder to diagnose without the rash because other symptoms mimic other diseases, like flu. To help diagnose these cases, doctors can ask the Massachusetts Department of Public Health or other labs to test their patient's blood for antibodies to the Lyme Disease bacteria.

How is Lyme Disease treated?

Lyme Disease can be treated with antibiotic pills if it is diagnosed early. Tetracycline seems to work best. Children under seven are given penicillin instead because tetracycline can stain their permanent teeth. Other antibiotics can be prescribed for people who cannot take tetracycline or penicillin. Prompt treatment of early symptoms can prevent later and more serious problems.

How can you prevent Lyme Disease?

The only known way to get Lyme Disease is from the bite of an infected tick. The best ways to prevent Lyme Disease are to know where these ticks are found, avoid these places, and promptly remove the tick if you do get bitten. If you live in or visit a high-risk area, follow these tips:

- Don't walk barelegged in tall grass, woods, or dunes where ticks may live.
- If you do walk in these places, wear a long-sleeved shirt, long pants, high socks (with pants tucked tightly into the socks), and sneakers. Light colors will help you spot ticks on your clothes before they reach your skin.
- Use insect repellants made with DEET (check the label) on your skin, and the ones made with permethrin on your clothes.
- Check for ticks every day. Their favorite places are on the legs, thighs and groin, in the armpits, along the hairline, and in or behind the ears. The ticks are tiny, so look for new "freckles."
- To remove a tick, use tweezers to grip the body firmly and pull it straight out. If you must use your fingers, protect your fingertips with a plastic bag or a tissue and wash your hands afterward. Put antiseptic on the bite.
- Drown the tick in alcohol or kerosene. (Never leave these liquids where children can reach them.)
- Know the symptoms of Lyme Disease. If you have been someplace likely to have ticks between May and early autumn and you develop Lyme Disease symptoms — especially if you get a donut-shaped rash — see a doctor right away. Early treatment can prevent later problems.

Where can you get more information?

Your local board of health
Listed in the telephone book under local government

Massachusetts Department of Public Health
Division of Epidemiology (617) 522-3700, x420 or 425

May 1990

PUBLIC HEALTH FACT SHEET

Rabies

Massachusetts Department of Public Health, 150 Tremont Street, Boston, MA 02111

What is rabies?

Rabies is a viral disease of the central nervous system (brain and spinal cord) that is almost always fatal. Rabies in humans is very rare in the U.S., but rabies in animals — especially wildlife — is common in some parts of the country.

How is rabies spread?

The rabies virus lives in the saliva (spit) and other body fluids of infected animals and is spread when they bite or scratch. The virus can also be spread if one of these body fluids touches broken skin or a mucous membrane (in the mouth, nose or eyes). In caves crowded with bats, it is even possible (but extremely rare) to inhale the virus floating in the air.

What kinds of animals spread rabies?

The rabies virus can infect any mammal (if it has hair or fur, it's a mammal), but it is only common among certain ones like bats, skunks, foxes and raccoons. Rabies is very rare among rodents like squirrels, rats, mice and chipmunks. Thanks to vaccines, rabies is extremely rare among pets and farm animals.

How common is animal rabies in Massachusetts?

Rabies is fairly rare in this state. Testing at the State Rabies Laboratory finds less than a dozen rabid animals (almost always bats) per year. However, rabies is on the rise among raccoons in the mid-Atlantic and southern New England states.

How can you tell if an animal is rabid?

Rabid animals usually behave strangely after the virus attacks their brain cells. Rabid animals often become aggressive, hyperactive, and easily frightened, so they will attack people or other animals for no real reason. Not all rabid animals act this way, however, so you should avoid all wild animals — especially bats, skunks, foxes and raccoons.

What should you do if you think you have been exposed to rabies?

If you have been bitten or scratched by a wild animal, or by a pet or farm animal that has been behaving oddly, follow these steps:

1. Wash the wound with soap and water **right away** for at least five minutes.
2. Call your local board of health and your doctor, nurse or health center as soon as you finish washing. They will help you decide if you need to be treated for rabies. Follow their instructions to the letter.
3. Contact your local animal control officer to catch or find the animal that scratched or bit you. Your local board of health can tell you how to get it tested by the State Rabies Lab.
4. If your pet has been bitten or scratched by an animal you think might be rabid, follow the same steps but call your pet's veterinarian instead of your own doctor in step 2.

What is the treatment for people exposed to rabies?

People who have never had rabies shots are given six shots in the arm, one at a time over the course of a month. (Rabies shots are no longer given in the stomach muscles.) The first shot is antibodies to fight the virus, and the rest are vaccine to ensure long-lasting protection. To work best, the shots should begin as soon after the bite or scratch as possible. However, if the animal has been caught and can be tested for rabies, some doctors wait until the test results come back to see if the shots are really needed.

How can you prevent rabies?

- Avoid wild animals, especially bats, skunks, foxes and raccoons. Avoid any animal — wild, farm or pet — that behaves oddly, and report it to your city or town's animal control officer.
- Make sure your pets are vaccinated against rabies and that their shots are up to date. By law, all dogs must be vaccinated against rabies. Cats should also get rabies shots because they are hunters by nature and often have contact with animals at high risk for rabies.
- Fasten trash can lids tightly. Garbage attracts animals (like skunks and raccoons) looking for an easy meal.
- Teach your children to avoid wildlife, strays, and all other animals they don't know well. Do not let your children (or pets) roam freely in areas where wild animals live.
- It is against state law to keep wild animals such as skunks, ferrets or raccoons as pets. There are no rabies vaccines for most wild species.
- If you have bats living in your house, talk to a professional about bat-proofing your home.
- Do not handle dead, sick, or injured wild animals yourself; call the police or animal control officer. If you must handle the animal, use heavy gloves, sticks or other tools to avoid direct contact.
- If you are bitten or scratched by an unfamiliar animal, do not try to guess if it is rabid. Call your doctor and local board of health for advice.
- Animal control officers, veterinarians and their assistants, and others who have a lot of contact with strays or wildlife should think about getting routine rabies vaccinations to protect themselves before they are exposed to the virus.

Where can you get more information?

Your doctor, nurse, or health center

Your local board of health

Listed in the telephone book under local government

Massachusetts Department of Public Health

Division of Epidemiology (617) 522-3700, x420 or x425

September 1991

THE DIVISION OF FISHERIES & WILDLIFE WORKS TO PROTECT THE PUBLIC

BY:

- Monitoring outbreaks of wildlife disease.
- Sharing information with humane and animal health authorities.
- Prohibiting the importation or relocation of wildlife and possession of wildlife as pets.
- Regulating wildlife population through the harvest of animals by licensed hunters and trappers.
- Increasing public awareness of wildlife through education.

WILDLIFE

RABIES

IN

MASSACHUSETTS

WHAT YOU

WILDLIFE RABIES IN MASSACHUSETTS

Rabies is a virus that affects the nervous system of mammals. If left untreated it is always fatal.

Rabies has occurred in Massachusetts periodically since the early 1800's. It has, from time to time shown up in dogs, cats, foxes and bats. Rabies currently occurs occasionally in bats, approximately 3-10% of bats annually submitted test positive for rabies. Since 1977 raccoon rabies has been spreading through the Mid-Atlantic and Northeast states. Rabies can also be carried by foxes, skunks, cats, dogs, and domestic livestock.

Rabies is spread through a bite or a scratch from an infected animal. You can protect yourself and your family by observing some precautions, and following a few simple rules.

PET OWNERS:

- Pets are the most likely bridge between wildlife rabies and people. Vaccinate cats and dogs for rabies.
- Dogs and cats may come in contact with raccoons and may be bitten or scratched. Keep pets restrained at all times.
- Feed pets indoors, do not leave pet food outside.

CAMPER, HIKER, PICNICKER:

- Do not feed wild animals.
- Do not approach or handle wild animals.
- Secure your food and garbage so that wild animals will not have access to them.

HOUSEHOLDERS:

- Do not approach or handle wild animals.
- Do not feed wild animals.
- Secure garbage and trash in trash containers with tight fitting lids.
- Place trash out for pickup on the same day it will be picked up by rubbish collectors.
- Cap chimneys with screens.
- Seal openings in attics, basements, porches, and sheds or barns.

❖ IF YOU HAVE CONTACT WITH AN ANIMAL SUSPECTED OF BEING RABID:

- ❖ Wash the wound thoroughly with soap and water.
- ❖ Seek medical attention immediately.
- ❖ If possible, capture, kill or confine the animal without damaging the head.
- ❖ Contact your local health department.