Vertebrate Pest Management

Vertebrate pests, while not as numerous or pervasive as disease or invertebrate problems, occasionally can be a real concern. A pest can be defined as an organism that causes, is perceived to cause or is likely to cause economic or aesthetic damage to humans or their property.

Before attempting to manage a vertebrate pest, there are many things you need to consider. First, is control really necessary? Several variables should affect your decision:

- What kind of animal is it? Positive identification is essential for effective management. Identification often must be done by studying signs left by the animal, since most vertebrates are nocturnal or difficult to observe.
- How much damage might occur without any control?
- What are the benefits of control versus the cost of damage? In other words, what are the economic or aesthetic thresholds at which the extent of potential damage warrants control?
- Is there any aesthetic or recreational value of the species involved, or is it legally protected? If so, your options may be limited.
- Finally, what effect will a control program have on non-target animals and the environment?

If, after considering these things, you still believe a control program is called for, there usually are several options, depending on the pest. Ideally, you want to eliminate or repel the pest or change its bad habits in a way that will not endanger humans, nontarget animals or the environment. Before beginning any direct control action, such as the use of traps or poison baits, think about whether there are alternative ways to manage the animals.

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Population dynamics and pest management

Some pests can be managed indirectly — without resorting to chemicals or traps — by manipulating their habitat. To manage habitat effectively, you need a working knowledge of population dynamics — or how populations change in relation to the environment.

Each living area has a limited carrying capacity for a given species; it will support only a limited number of that species. Excess population either dies or migrates.

Carrying capacity is determined in part by three limiting factors: food, water and shelter. If you can control these factors — especially food and shelter — you can manipulate the population density even if you do nothing else.

Managing common vertebrate pests

Rats and mice

Neither rats nor mice are native to Alaska but have been introduced through unintentional transportation or the release of pets. Worldwide, rats and mice are the most notorious vertebrate pests that plague humankind. Of these, the Norway rat (Rattus norvegicus) and the house mouse (Mus musculus) are the most common.

Adult Norway rats are robust, weighing 10 to 17 ounces, and are 13 to 18 inches in total length. The tail usually is shorter than the head and body. Color ranges from gray to brown to almost black.

The roof rat (Rattus rattus) is the same length as the Norway rat but lighter in build and not as common. The tail is longer than the combined head and body length, and the belly often is white.

The common house mouse is second only to rats as a destructive pest. House mice can be distinguished from young rats by their proportionally smaller heads and feet. These three rodents are not native to North America, but stowed away in the ships of early European arrivals.

Rats and mice are mostly nocturnal, so an infestation often goes undetected until the rodents become numerous. By knowing what signs to look for, you usually can catch a rodent problem before it gets out of hand.

Rats and mice tend to move over regular routes and usually produce defined runways. The runways show up particularly well in dusty areas, especially if flour or other tracking powder is sprinkled around likely spots. Outdoors, rats leave trails through vegetation and dig or gnaw 2- to 3-inch holes around buildings and foundations. Another telltale sign is the grease smudges that rats leave when traveling close to a wall, around a beam or through a hole. Finally, fresh rat and mouse droppings, which are moist and soft, are a reliable sign of infestation.

There are four important steps to effective rat and mouse control:

- Eliminating harborage (shelter)
- Rodent-proofing structures
- Eliminating food and water
- Killing the rodents

Eliminating harborage

Elimination of harborage often is overlooked in a rodent control program but is an easy way to discourage rodents. Rats in particular like to inhabit woodpiles and stacks of stored material. Place stacks or piles on
pallets at least 8 inches off the ground; 18 inches is even better. If possible, the stacks should be 18 inches from walls and no more than 6 feet wide, with at least a 12-inch aisle between stacks.

Reduce dense vegetation and rubbish piles around structures as much possible. Prune ornamental shrubs away from the ground. Also, avoid planting groundcovers such as ivy that offer harborage to rats. Finally, block spaces under buildings and fill in old burrows.

**Rodent-proofing structures**

Complete rodent-proofing usually is not possible, especially in barns and older buildings. If approached properly, however, rodent-proofing goes a long way toward reducing an infestation.

To keep rats out of buildings, close any opening they can get their teeth into (that is, more than ½ inch in diameter). Mice often can squeeze through openings as small as ⅜ inch. Be sure to seal openings around pipes and floor drains and keep drains tightly covered. Cover edges subject to gnawing, such as door bottoms, with heavy sheet metal or wire mesh. Place metal rat guards on pipes, wires and other places rats climb. Cover other openings with 19-gauge or heavier hardware cloth with ¼-inch or less mesh. In severe cases, you can keep rats from burrowing under foundations by building an offset curtain wall of concrete, hardware cloth or sheet metal.

**Eliminating food and water**

Elimination of food and water is the third step in effective rat and mouse control. Strict control of food materials is essential in any rodent control program.

The following steps can be helpful:

- Be sure all human and animal foods are stored in rodent-proof buildings, rooms or containers.
- Dispose of garbage and other waste in tightly covered metal cans.
- Never feed outside pets more than they can eat at one sitting.
- Be sure to clean up pet droppings. Rats can do very well on a straight diet of feces.
- Clean up windfall fruits and ornamental seedpods.
- Don’t scatter food for birds and squirrels. Be aware that birds often throw seed onto the ground, so a rodent-proof feeding station is no guarantee that you won’t have pest problems.

**Killing existing rodents**

Along with general cleanup and controlling food sources, you can directly reduce infestations by careful use of rodenticides and traps.

**Rodenticides**

Poisons are one option for killing rats and mice. There are several effective rodenticides on the market. They are available as concentrates, mixed baits, weather-proof blocks and premeasured packets. All are effective and safe to use as long as you follow the label directions. **Always read the label before using any pesticide.** Check with your local Extension office for the current registered rodenticides for Alaska.

One of the main disadvantages of acute, or quick-kill, rodenticides is that the target animal often samples just a small dose of the bait to begin with. Sublethal doses of these quick-acting poisons make the animal very sick. After recovering, the animal becomes bait-shy and difficult to poison. To overcome this problem, it’s best to first bait the area with grain until all of the rodents are feeding well. Then replace the nontoxic baits with a quick-kill rodenticide that contains a similar grain base. Since the rodents are used to feeding at these stations,
they will gorge on the poison and die. This technique results in quick control and often is the most economical method when dealing with large numbers of rodents.

Once control is achieved with any rodenticide, it’s a good idea to continue with a preventive baiting program using an anticoagulant. This step is especially important on farms and other areas where there is a good chance of reinfestation. A tracking patch of flour or dust placed along walls is an excellent way to check for rats and mice. Permanent, tamper-proof bait stations placed around buildings will take care of incoming rodents before they become a problem. Place bait stations at least every 15 to 20 feet where rodents have been active. Remember, if there is a lot of other food available, too few bait stations, not enough bait, or if you stop baiting too soon, you will not get good control.

To be most effective, bait stations must be placed where rodents can get to them easily. At the same time, they must be protected from dampness, pets, stock, and children. One effective method is to place pans of bait in runways and cover them with a board or a box with a hole in each end. For prolonged baiting and outdoor situations, you can make or purchase a tamper-proof bait box to safely present a continuous supply of fresh bait.

With baiting, rodents sometimes die between walls and begin to smell in a couple of days. If you can locate the odor source, drill a small hole in the wall 6 inches above the floor, and spray in a pint of deodorant or disinfectant. Repeat between the two adjacent studs. Commercial deodorants are the most effective and may be available through hospital supply houses or drugstores.

Hard-to-locate odors sometimes can be pinpointed by releasing a few blowflies in the room. The flies will congregate on the wall at the source of the problem, which then can be treated. If you cannot locate the odor precisely, apply deodorant in the general area. If left untreated, the odor usually disappears in about a month but may last longer. Be aware that a dead carcass may attract other insects such as carrion beetles.

**Trapping**

Traps are especially useful when you don’t want to use poisons, or for catching bait-shy rodents that survive a baiting program. One of the big advantages of trapping is that pests don’t die in an inaccessible place where they may cause odors.

When trapping rats, it is most effective to set one or two traps at least every 15 to 20 feet wherever there are signs of activity. For mice, place traps every 5 to 10 feet. Place traps facing the wall along baseboards and near possible entry holes or other cover. When possible, wire traps to a secure anchor to prevent dying rodents from dragging them off.

You may have to try several baits to find what works best in your situation. Nuts, gumdrops, or raw bacon usually work well. Whichever bait you choose, be sure it is fixed securely to the trap so it cannot be licked off. Being cautious by nature, rats sometimes avoid a trap or strange bait for as long as 14 days. Mice, on the other hand, generally are unwary and easily caught.

Glue-board traps are quite effective when set in runways. Large ones can be used for either rats or mice, but rats sometimes can escape with these traps, so fasten them down if possible. In addition, remember that glue-boards do not work well in cold, wet or dusty areas, and that captured rodents often are alive and struggling when found.

Remember to check traps daily to remove dead rodents and reset sprung traps. Wear
gloves when emptying traps to avoid being bitten by fleas or lice. Drop the dead rodents into sealable plastic bags for disposal.

**Electronic sonic repellers**

These units, made by several companies, emit sonic waves, which are said to disrupt rodents’ activities and eventually drive them away. When tested under laboratory conditions, none of the devices has proven effective for any pest.

**Bats**

Bats are the only true flying mammals. They sometimes invade attics and wall voids. Although they usually don’t cause any structural damage and in fact eat insect pests, many homeowners dislike the noises they sometimes make. In addition, large colonies leave a lot of smelly guano and may carry parasites. Furthermore, infected bats sometimes transmit rabies. For this reason, never handle a live bat with bare hands, and especially avoid handling any bat acting abnormally, such as fluttering on the ground. If you are bitten or scratched, capture the animal with the brain intact for examination by health authorities. Be sure your pets are vaccinated and don’t allow them to lick your skin if they might have access to bats.

The bat that causes most problems in buildings in Alaska is the little brown bat (*Myotis lucifugus*). These little animals are highly colonial during summer and winter. The summer and winter roosts usually are separate. Young are born in June or July, one per female.

The surest way to eliminate or prevent a bat problem is to close possible entry points. Depending on the species, bats can enter cracks as narrow as ⅜ inch wide. Older structures may be very difficult to bat-proof.

Before bat-proofing a building, first evict any bats present. To do so, hang ¼-inch mesh bird netting loosely over the entrances. Secure it on the top and sides with duct tape and leave the bottom free-hanging a foot or so below the opening. Bats will be able to leave but not return. Depending on the building, two or more nets may be needed. Do your bat-proofing early in the summer or in the fall to prevent young, flightless bats from dying inside. It’s a good idea to erect a bat house nearby to give the animals a place to go. Doing so may prevent them from looking for other ways into the building.

After evicting the bats, which may take 3 or 4 days, close large openings in the building with sheet metal, wood or ¼-inch or smaller screen. Caulk small holes, cracks and gaps in shakes and tiles, or fill them with foam insulation. Any lingering odors can be masked with deodorants or disinfectants.

**Voles**

There are several species of voles (*Microtus spp.*), or “meadow mice,” in Alaska. All of them are plant feeders that eat mainly grasses and seeds, and many are proficient burrowers. These small, short-eared, short-tailed rodents can cause damage in orchards by feeding on tree roots and girdling trunks. They may tunnel through vegetable and flower gardens, feeding on juicy roots, tubers and bulbs.

Voles are active day and night in all seasons. They are seldom seen, as they spend most of their time underground or in dense
grass and under the snow in winter. They can have as many as five litters per year with as many as four to eight young per litter. They live about one year and are the main food source for many predators.

How can you tell whether you have a vole problem? Obvious signs include gnawed roots and root crops. (Note the small grooves left by the two large front teeth.) In badly infested orchards, wiggle trees during the dormant period to locate dead ones. If they move very much, the entire root system probably is gone. During the growing season, damaged trees are leggy and thinly leafed with a reddish tinge to the foliage. If you pull up a vole-damaged tree, the underground part often looks as if it has been run through a pencil sharpener. Girdling of tree trunks just above the soil line and extensive, well-used tunnels through soil, grass or thatch are other signs of infestation. Finally, voles often leave open, 1-inch holes in areas of heavy activity.

Vole damage sometimes is confused with that caused by rabbits, but there are differences. Rabbits usually damage trunks and twigs higher up and leave larger tooth marks at 45° angles.

Voles rarely venture into houses, although red-backed voles will enter cabins and camps.

Management
Vegetation management is key to keeping vole populations low. For example:

- In orchards, keep the tree rows free of vegetation at least 36 inches on both sides of the trunks, either by weeding or using a registered herbicide. If you use a string weeder (such as Weed-eater or Weed Whacker), be sure not to hit trunks. Despite assurances that they are safe, these tools can injure the thin bark of young trees.
- Mow the grass between rows and keep it short.
- Prevent or eliminate thatch that voles can hide under.
- Be very careful if you use mulches around trees and shrubs! Voles often are encouraged by a nice, loose mulch.
- Be sure to pick up fallen fruits so voles cannot feed on them.
- In gardens, try to keep surrounding areas free of tall grass and thatch, and don’t leave root vegetables in the ground over winter.
- Removing the snow to less than an inch in a band around areas you want protected will prevent them from reaching those plants.
- Be aware that fallen seed from bird feeders is very attractive to rodents of all kinds.

Controls

Biological
Almost all small meat eaters love to feed on voles. Hawks, owls, coyotes, foxes, weasels and shrews can help keep vole populations from exploding.

Mechanical
Place hardware cloth cylinders (¼-inch mesh) around the lower trunks of shrubs and young trees to exclude voles. Be sure to bury the lower edge 6 inches deep.

Tree guards that control rabbit damage do not discourage voles since they feed mostly underground. In fact, voles have been known to nest under loose-fitting guards!

For very small populations, trapping may provide sufficient control. Use ordinary mousetraps baited with peanut butter or apple. Dig into underground tunnels to place the traps and then cover them with boards. Check traps daily and reset as needed. This
method is very time-consuming but useful where you don’t want to use poisoned baits.

**Chemical**

There are no rodenticides registered for homeowner use against voles in Alaska.

**Shrews**

Shrews are the smallest of the mammals. There are about ten species (*Sorex spp.*) that occur in Alaska. They range in size from about 3 to 6½ inches in length. They have very short legs, a long pointed nose with long whiskers, and their tails are one quarter to half their body lengths. Shrews are active all year. They are often mistaken for mice and related rodents but are in fact insectivores. They are not considered pests and are beneficial since they eat pest insects; however, they can become a problem in the home or cabin if meat is left out uncovered.

**Ground squirrels**

The arctic ground squirrel (*Spermophilus parryii*) may be encountered in central and south central Alaska. Ground squirrels feed mostly on vegetation and could be damaging to gardens. They also are vigorous burrowers, leaving many open holes throughout their home ranges.

Arctic ground squirrels hibernate during the winter. Because they have to put on a lot of fat for the winter, they are very efficient foragers during the short summer season.

**Management and controls**

Ground squirrels can be excluded from buildings with standard rodent-proofing techniques. Metal rodent guards usually protect fruit and nut trees. Fencing usually is not effective in barring these rodents from an area, nor do scare devices work.

Ground squirrels are considered fur-bearers in Alaska. Check with the Alaska Department of Fish and Game for any regulations on hunting or trapping.

**Tree squirrels**

Alaska has two tree squirrels, the red squirrel (*Tamiasciurus hudsonicus*) and the northern flying squirrel (*Glaucomys sabrinus*). The red squirrel mostly feeds on spruce cones but may cut twigs from other trees. They are attracted to bird feeders. They also cause problems to the homeowner when they invade the attic or walls to nest. Northern flying squirrels prefer dense forest canopies and are not considered pests.

**Management and controls**

Red squirrels are considered fur-bearers in Alaska. Check with the Alaska Department of Fish and Game for any regulations on hunting or trapping.

Try these nonlethal methods of control:

- In areas where squirrels are a potential problem, eliminate food sources to keep the carrying capacity low. Lots of food means lots of squirrels! Clean up fallen fruits and ornamental berries and seeds as much as possible. If you feed birds, be sure to use squirrel-proof feeders.
- Cover attic vents with heavy wire mesh and seal other openings. Waiting until late summer or fall to remove the nesting material and sealing the opening prevents trapping the young inside and the resulting odor of dead animals and the attraction of secondary insects.
- Protect plants somewhat with registered repellents or wire cages.
- If squirrels are digging up bulbs, lay down chicken wire over the bulbs, stake it securely, and cover it lightly with mulch.
• Protect fruit trees by placing rodent guards on the trunk 6 feet off the ground. This method will not work if there are tall trees, fences or buildings nearby from which squirrels can leap to trees.

Moose, deer and elk

Moose (*Alces alces*), Sitka blacktail deer (*Odocoileus hemionus sitkensis*) and elk (*Cervus elaphus roosevelti*, introduced in some locations) are present in Alaska. They are highly valued as game animals and watchable wildlife. In a garden or orchard, however, they can cause extensive and continuing damage to crops and ornamentals.

Moose, deer and elk feed on a wide variety of plants, both woody and herbaceous. Most damage is caused by browsing on woody ornamentals, fruit trees and other crops. Browsing damage is easily identified by the ragged tips where twigs have been broken. Rodents and rabbits, in contrast, leave a clean cut when they browse.

Management

The only consistently effective tool for reducing moose, deer and elk damage is fencing. Fences range from simple electric fences to expensive, 7-foot (or higher for moose), high-tension fences or woven-wire fences. Simple fences are quite effective in areas where the animals are just beginning to cause damage. In areas where they have been feeding for some time, more impenetrable fences are necessary.

It is important that fences be visible so that animals don’t accidentally stampede through them.

If moose, deer or elk are browsing on a few plants, you can place cylinders of welded wire mesh around each one. New seedlings can be protected with plastic mesh tubes or netting.

In some cases, registered repellents can reduce damage sufficiently. However, they must be reapplied periodically, especially after heavy rain. If animals are used to feeding in an area, repellents are less effective. Replacing heavily damaged plants with more resistant varieties is another option. There are many kinds of ornamental plants that moose, deer and elk don’t like. However, even some of these plants are browsed when animals are really hungry, especially when late spring snow buries emerging vegetation.

For more information specific to your location, contact your local Extension office.

Rabbits

In Alaska there are two rabbits, the native snowshoe hare, (*Lepus americanus*) and the introduced domestic rabbit (*Oryctolagus cuniculus*).

Rabbits and hares are prolific (a little less so in Alaska), having as many as three litters per year, with several in each litter. Hares and rabbits eat a wide variety of herbaceous and woody plants. They often feed on bark and stems during winter, when they cause a lot of damage to gardens and orchards, especially during peak population years. In spring and summer, they develop an appetite for flowers (especially tulips) and vegetables.

Rabbit-damaged trees and shrubs are easily identified by characteristic tooth marks. Twigs usually are clipped cleanly at a 45°
angle, and bark on lower stems and branches is gnawed away, leaving parallel grooves in the wood.

**Management and controls**

One of the most effective methods of reducing rabbit damage is to fence the animals out. The fence should be 30 to 36 inches high with the bottom 6 inches bent outward and buried 6 inches. Mesh size should be no more than 1 inch.

Protect individual plants with cylinders of ¼-inch mesh hardware cloth about 18 to 20 inches high. Commercial tree wraps also can be effective.

Habitat manipulation also can help reduce rabbit/hare damage. Removing brush piles and other hiding places will reduce the overall number of animals in an area.

Several repellents are registered for rabbit and hare management. Most are somewhat effective if feeding pressure is not too great. Many are labeled for use only on ornamentals.

Since hares usually are classified as game animals, contact the Alaska Department of Fish and Game for any regulations on hunting or trapping. However, the department does not regulate feral or loose domestic rabbits. Contact your local animal control office for information about borrowing live traps.

**Beavers and Porcupines**

Beavers (*Castor canadensis*) and porcupines (*Erethizon dorsatum*) could, under certain circumstances, show up in your yard, especially in rural areas.

Beavers live and feed near water. Besides using trees for their dams, they eat bark, young trees and the foliage, often dragging the twigs to their dens for storage. As the younger trees near the pond are cut down, beavers will forage farther as long as they feel safe from predators. Fencing around trees will keep them out as long as it is at least 4 feet high and sturdy enough that they cannot tip it over. Also keep over-hanging branches out of reach since they will pull them down and cut them off.

Porcupines are nocturnal, moving and feeding in trees at night. They are slow moving but have their quills for protection. They feed mostly on the inner bark of spruce and hemlock in winter and the buds and young leaves of birch, aspen and willow in the spring and summer. Their diets are low in sodium so they will often seek it from other sources, including natural licks, the glue that bonds plywood together, human perspiration on tools, road salt and some paints. Keeping these materials stored away or behind fencing helps avoid encounters with porcupine quills. Protecting trees with fencing is costly so weighing the chances of porcupine damage should be considered. If fencing is warranted remember that porcupines move from tree to tree through the branches when possible.

Hunting and trapping beavers and porcupines are regulated through the Alaska Department of Fish and Game.

**Birds**

Birds can cause problems in gardens by their roosting, nesting and feeding habits, depending on the species. The most common culprits are magpies, crows, starlings, woodpeckers, pigeons, house (“English”) sparrows, robins and geese. Other species may be occasional pests.

Bird management can present special problems, since most species are protected by law. However, there are many tools available for reducing damage.
Roosting and nesting damage

Where birds roost or nest, there will be droppings. Bird droppings can damage machinery and stored feed and present possible disease hazards.

Roosting can be prevented by making the area uncomfortable for birds through the use of barriers. Solid, angled barriers or wire obstructions (“porcupine” wires and stretched wire) can prevent birds from using ledges as roosts. Wire obstructions also work well on building peaks.

“Bird glues” also can reduce roosting. Birds don’t like getting these sticky materials on their feathers, so they usually avoid them. Glues must be reapplied occasionally and don’t work well in dusty or wet conditions.

House sparrows, starlings and swallows often try to nest in or on buildings. Bird netting, screens and wire barriers can prevent these invasions. Try to close up any unnecessary openings.

Woodpeckers can present special problems when they use a structure as a drumming station during courtship. Cedar siding is especially attractive and prone to damage. An infestation of carpenter ants or solitary bees also can lure woodpeckers to peck holes in wood siding. If carpenter ants are present, eliminate them.

Scare devices sometimes are useful in driving these birds away. Another method is to hang bird netting from the eaves so it dangles a few inches from the side of the structure.

Crop damage

Birds can cause extensive damage to all kinds of crops. Crops most prone to damage include strawberries, cherries, blueberries and apples. The following methods can reduce damage:

- Bird netting is useful for protecting low-growing plants. Be sure the netting reaches the ground or is gathered around the trunk of the plant, or birds will fly up underneath to feed.
- Various scare devices, such as scarecrows, hanging flashers, flags and balloons, can reduce damage if you move them about so birds do not become accustomed to them.
- Sonic devices that broadcast alarm calls are useful for the particular species making the call, but may not be appropriate if you have nearby neighbors. Ultrasonic and subsonic devices have not been proven effective on any pest species.
- Trapping can be used only against non-protected birds (house sparrows, domestic pigeons and starlings) but can help reduce local populations of these species. Specific kinds of cage traps must be used to avoid harming protected species.

Resources

UAF Cooperative Extension Service publications
So You Have Mice – Now What? PMC-00200.

Alaska Department of Fish and Game publications
Wildlife Notebook Series, ADF&G.