

## Ch. 5: Best practices, a step-by-step guide

### *Overall learning objectives for this chapter*

- *Understand the best practices approach to solving wildlife conflicts.*
- *Know how to interview people and inspect sites to figure out what caused the problem.*
- *Describe the different management options available to your customers.*
- *Be familiar with the techniques used to remove wildlife from buildings and outdoor areas.*
- *Identify the different euthanasia methods, and know when and why you might use each one.*
- *Understand how to prevent wildlife damage.*
- *Know why it's important to evaluate your practices, and what you can gain from this effort.*

## INTRODUCTION

### *Learning objectives*

- 5.1 *List the five steps involved in the best practices approach to solving wildlife conflicts.*
- 5.2 *Give one example of why it's crucial to properly identify which species is causing the problem.*

As a wildlife professional, we hope you'll help your customers understand that they can protect their homes and businesses from wildlife damage without banishing all wildlife from the community. Whenever possible, use best practices and encourage your customers to solve their problems for good—not just temporarily.

Remember, in chapters one and two, we described a best practice as an effective method for solving a nuisance wildlife problem that also minimizes risks to the environment and our health and well-being. This decision-making strategy balances concerns about safety; the humane treatment of wildlife; practicality; landowner rights; the protection of wildlife populations and habitats; and ethical, legal, financial, and aesthetic issues. Often, the most effective long-term solution involves the use of several best practices, such as a combination of removal and exclusion.

This manual focuses on best practices but in some circumstances, legal techniques that aren't described

in this manual may be appropriate. For example, in an emergency, the need to ensure safety may be so pressing that a technique which doesn't satisfy all of the criteria well enough to rate as a "best practice" is considered the best choice for that situation. That's one of the strengths of the best practices approach: it's flexible and offers many options.

Some methods that seem questionable today could be perfected and achieve the status not only of best practice, but also become standard operating procedure. For that reason, we have included discussion of some practices that have not yet been well-researched, but seem promising. If you're wondering about the merits of a tool or technique, seek information from a trustworthy and current source. (Again, you may wish to check the online version of this manual at <http://wildlifecontrol.info>).

Now, with your understanding of the best practices decision-making strategy, and the legal and safety issues you may confront on the job, we're ready for the details, the tools and techniques that form best practices. This is when you get to play detective: investigating the situation, and then using your expertise to solve the puzzle.

### **The best practices approach to solving a wildlife damage problem includes five steps:**

- 1. Assess the situation**
- 2. Choose management options**
- 3. Do it (tools and techniques)**
- 4. Prevent future problems**
- 5. Evaluate success**

Sounds like a lot of trouble! Is it worth it? Yes. Here's a real-life example that shows why. In one case, night herons were raiding a fish hatchery. Researchers wanted to know if they could fake out the birds, so they played a tape of a propane cannon explosion to drive them off (that's much easier than using the real thing). But six nights later, the birds were used to the noise and settled back down to their dinner. Then the scientists tried a recording of night heron distress calls. Bingo! More than 80% of the herons left the pond, and six months later, this technique still worked. Here's the crucial bit: most birds only react to distress calls from their own species. So if the researchers hadn't bothered to properly identify who was causing the damage, they might have used the wrong sounds.

Maybe you don't handle agricultural problems, but don't worry, you'll encounter many cases of mistaken identity. Some customers may confuse raccoons for badgers (which aren't even found in New York), woodchucks for muskrats, or moles for voles. Is it a young Norway rat or an adult house mouse? The techniques used to deal with those animals differ. Proper identification is the first step to identifying the source of the problem.

Resist the temptation to jump to conclusions, too. Just because an animal is seen at the "scene of the crime" doesn't mean it's the culprit. For example, turkeys are sometimes blamed for crop damage that was actually caused by raccoons. Why? Turkeys are active during the day, so people are more likely to notice them in the fields. Raccoons are primarily nocturnal so fewer people are aware of their activities.

A note about this chapter's organization. It's long and there's a lot of important information, so we've broken it into five sections, to match the five steps of the best practices approach.

To help you keep the big picture in mind, there's a box on the righthand-side of each page spread that lists all five steps. If we're in section one, discussing step one, then you'll see all the details for step one. And if something is mentioned in that two-page spread, it shows in boldface type in the box. So, for example, on page 5-3, you'll see that Step One, "Assess the situation" now has two bullets under it: "interview" and "inspection." In this spread, "assess the situation" is shown in boldface. On page 5-5, that switches to "assess the situation" and "interview." We hope this will make it easier for you to remember the key points and see how it all fits together. Later, once you're familiar with the information, it should also make it easier to quickly look up something.

#### Higher, deeper, further...

- Start your own "wildlife: who is it?" file, for those species that customers often misidentify, such as moles and voles. Jot down a few quick questions you could ask over the phone to help identify the species correctly.

## Summary

Before you move on to the next section, you may wish to review the learning objectives for this section:

- 5.1 *List the five steps involved in the best practices approach to solving wildlife conflicts.*
- 5.2 *Give one example of why it's crucial to properly identify which species is causing the problem.*

## Review questions

1. Your customer believes there are rats in their apartment. You find smudge marks on the wall and dry, hard droppings that crumble when you touch them. The table lamp's wire is frayed. You want to put down nontoxic tracking powder to determine if there's still an infestation, and if so, whether it's rats or mice. This upsets your customer, who wants you to put down traps immediately. How do you explain your strategy?
  - a) My traps are expensive, so I don't take them out unless I'm sure they're needed.
  - b) To do the best job for you, I have to be sure whether it's rats or mice because the techniques for catching them are different. For example, I'd use a smaller trap for mice.
  - c) I charge more for rats so I'd need to know before I write up the contract
  - d) I'm writing a book and need a good photograph of rat tracks. Do you mind?
2. Pick the 5 steps involved in the best practices approach to solving wildlife conflicts:
  - \_\_\_ assess the situation
  - \_\_\_ order pizza for your crew
  - \_\_\_ take photos of the whole site for your records
  - \_\_\_ choose management options
  - \_\_\_ do it (use those tools and techniques)
  - \_\_\_ clean-up all the signs of the animal's presence
  - \_\_\_ kill the animals
  - \_\_\_ prevent future problems
  - \_\_\_ evaluate your success

#### Answers—

1: b (In addition to using a bigger trap to catch rats, you also need to pre-bait because rats are afraid of new objects. Mice are curious and will investigate traps).  
2: the five steps to best practices for nuisance wildlife control are: assess the situation; choose management options; do it (use those tools and techniques); prevent future problems; and evaluate your success.

## STEP ONE: ASSESS THE SITUATION

### Learning objectives

- 5.3 Describe two benefits of doing a thorough inspection.
- 5.4 Give an example of a question you'd ask to figure out whether a problem was caused by a raccoon or a squirrel.
- 5.5 Describe four kinds of animal sign that you'd look for during an inspection.
- 5.6 Your knowledge of wildlife habits helps you estimate how many nuisance individuals may be present—before you even get to the site. Describe two biological facts that led you to this conclusion.
- 5.7 You've just noticed something that's going to change the way you deal with this situation. What was it?

The very first thing you need to do is find the source of the customer's problem. That means you'll need to understand the type of damage and how bad it is. You have to identify the culprit. You'll look for clues that will help you figure out what attracted the nuisance animals to the site. (Remember the two key enticements, food and shelter).

Wild animals usually provide numerous signs of their presence. Once you've gained experience in "reading" these signs, the clues you gain from your site inspection and customer interview should help you identify the species, estimate the number of animals present, and find the areas where they're most active.

### SIGNS OF WILDLIFE PRESENCE:

- **Visual sighting.** This is one of the easiest ways to identify the species (if you can trust the observer). You may also find carcasses. If nocturnal animals are often seen during the day, this may mean that the animal has young and is feeding more often, or that the local population is high, especially with rats and mice. If dealing with a bat colony, you may quickly identify the species but have a harder time locating the entry holes. You can use this to your advantage. Stand outdoors at dusk or dawn, and watch where the bats enter or leave the building. There's the hole!
- **Sounds.** Various squeaks, growls, cries, hisses, chitters, screeches; gnawing; or clawing, scampering, and climbing inside the walls, above the ceiling, between the floors, or underneath cabinets. Learn to tell the sounds of adults from those of young.

Best practices for solving a wildlife problem, step-by-step

#### 1. ASSESS THE SITUATION

- interview
  - inspection
2. Choose management options
  3. Do it (tools and techniques)
  4. Prevent future problems
  5. Evaluate success

- **Odors.** You may smell the droppings, fermenting urine, or body oils of wildlife that are living indoors. With a little experience, you can tell the odor of a house mouse from that of a rat. Skunks have a well-known scent, but woodchucks can also be told by their odor. Dens of other animals, including raccoons, have their own perfume.
- **Droppings** may be found along runways, near shelters, in piles near an entry hole, or in other places used often. Fresh droppings are shiny and soft in texture, while old ones are dry, lighter in color, and hard. Old droppings crumble easily.



Left: You'll often see a pile of bat droppings under the main entry hole. Right: Notice the urine stains on the chimney (from bats).

- **Urine.** You can see rodent urine using an ultra-violet light—it glows blue-white. Unfortunately, other materials also do this, which can be confusing until you become familiar with the typical background fluorescence of a home or office. You may also notice discoloration on building materials, often in attics or crawl spaces. That's caused by a large amount of urine, which could indicate the presence of raccoons, flying squirrels, or a large bat colony.
- **Nests and food caches** can sometimes be found when cleaning garages, attics, basements, closets, and other storage places. Rats, squirrels, and other rodents often store food in attics.





Animals often gain entry under the eaves, as did a squirrel in this home.

• **Entry sites** (holes, cracks, loose siding). The location, size, and condition of the entry sites are important clues to the species involved.

- **Burrows.** Woodchucks, chipmunks, moles, voles, and Norway rats burrow, and you can learn to tell their burrows apart. (Other animals, including raccoons and skunks, will use burrows but they don't make them). The location of the burrow, its size, the type and number of entrances, and objects located near the burrow will help you identify the species.
- **"Leftovers."** You'll sometimes find the remains of a meal near an animal's den. You may be able to identify what the animal was eating, and that can help you identify the animal using the den. For example, you'll often find a fair amount of prey remains, such as rabbit fur, near the den of a fox or coyote. If there's no sign of prey, then you're probably dealing with a herbivore, such as a woodchuck.
- **Runs.** Smooth or worn trails may be found next to walls, along fences, or under bushes and buildings. Runs within buildings may be well-polished trails that are free of dust. Trails through insulation are common.



Above: A raccoon climbed this pipe to gain entry to the attic. See the marks?

Right: Buildings are vulnerable at their joints. Check carefully for smudges that show an animal's been going in and out.

• **Smudge marks** are often seen in the animal's run where it rubs against a surface during its travels, leaving behind dirt and oil from their fur. Look on pipes, beams, against walls, and on the outside edges of holes.



• **Tracks and claw marks.** Footprints, tail marks, and wing prints may be found in dusty surfaces, sand, soft soil, and in snow. If the surface doesn't show tracks well, you can sprinkle nontoxic tracking dust (such as chalk powder, flour, or unscented talc) in a likely area, then return later to see if there are any tracks. When used outdoors, the dust must be protected from wind and rain. You may find claw marks on woodwork, trees, or in dust. Consider photographing and labeling the images (after you're sure you've properly identified the species).

• **Hair, feathers, or shed skins.** You may find tufts of hair on a fence or baseboard, feathers in an attic or above a dropped ceiling, or, less often, the shed skin of a snake. With practice, you may be able to identify the species from this sign. To improve your identification skills, consider making some hair sample charts. Clip a tuft of hair from a nuisance animal you've dispatched, and attach it to the chart with the species identified.



What happened here? A squirrel, trapped in a basement, tried to chew its way out. Top: The squirrel tried to squeeze underneath the door that led to the basement, gnawing and scratching at the bottom of the door and the rug. See the bits of wood and shredded fabric? Bottom: It also chewed on the window in the basement, hoping to escape that way. The squirrel chewed most of the mullions down to bare wood. See the bits of wood on the ledge?



• **Gnawing** (wood chips, tooth marks, holes, shredded fabrics, frayed wires). Look for evidence of chewing wherever wildlife might try to enlarge a crack or enter something. Wood chips may be seen near baseboards, doors, basement windows, kitchen cabinets, furniture, and stored materials. You could find shredded clothing, or see toothmarks on pipes. Rodents and raccoons often chew on the insulation around wires. The size of the toothmarks (or of a hole chewed in a baseboard) will frequently help you tell whether you're dealing with rats, squirrels, or mice.



- **Pets become excited.** When cats or dogs hear or smell rodents in some inaccessible spaces such as a wall, they may become enormously interested, whining, sniffing, and scratching at the spot.
- **Access routes.** Walk around outside and try to imagine the route the animal might have used to gain entrance to the building. Are there trees or utility lines near the roof? Could it have crawled under a porch, up a chimney, or along a downspout? Is there an attached garage that might have been left open? These clues point to likely culprits. Skunks, for example, aren't going to jump from a tree branch onto the roof, and squirrels aren't as likely to wriggle in underneath a porch.

Your knowledge of the habitat preferences and behavior of wildlife will help you estimate how many animals might be present. For example, if your customer complains of noises in the attic in March, you're probably expecting to find squirrels, and not just one—probably 3 to 8, because that's when female squirrels are raising their young. (If you see a female mammal, you may be able to tell if she's nursing because her nipples would be larger. This is hard to see on some of the small, fast-moving animals like flying squirrels. So if it's the breeding season for that species, assume that young may be present. And be careful, because individual animals may give birth outside of the textbook breeding season.)

Other aspects of the animal's lifestyle that help you answer the question, "how many?" include its social habits (generally found alone, or in a group?), daily movements, and whether or not it hibernates or migrates. How fresh are the signs? Is this problem new or is it well-established? How large is the property, and how many individuals of that species would you expect it to support?

But you're more than a wildlife detective. You also have to nose around in your customer's home, and ask questions to find out if the inhabitants (or their neighbors) are causing the problem. People sometimes feed or house wildlife without realizing it. Squirrels, for example, may be attracted to spilled seed at a bird feeder. Maybe not a big problem. But once nearby, they may run across the roof and find a hole that gives them access to the attic. Perhaps they decide that's an ideal place to raise their young. To solve this conflict, you'll probably need to remove the food source and repair the building.

Best practices for solving a wildlife problem, step-by-step

#### 1. ASSESS THE SITUATION

- **interview**
  - inspection
- 2. Choose management options
- 3. Do it (tools and techniques)
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There are other things you need to know about your customers before you choose a strategy, such as whether or not there are any pets roaming freely in the area. So, Sherlock, how do you proceed? Most NWCOs interview their customers and inspect the premises to look for clues.

Here are the questions you'll hope to answer with clues gained from the interview and the inspection:

- Which wildlife species is causing the problem? Is there more than one species involved?
- How many individual animals might be present?
- Could there be young present?
- Is this the first time they've had a wildlife problem? If not, what happened before?
- How long has this problem existed?
- Are the culprits readily accessible, or hard to reach?
- How risky is this situation for you, your customers, and their neighbors?
- Can you target only the offending animals?
- Will it be easy to be discreet, or would your control activities be in public view?
- If you repel or exclude the animals, where might they go?
- Does this look like a short-term problem or one that's likely to happen again and again?
- Given the location of the site, are there any local laws that would affect your management options?
- In addition to this problem, do you see signs that could predict future problems?

## Interview

First, it's best to talk to the right person—whoever knows the most about the problem and the property. Ask both general questions and some very specific ones. A general question might be, "Please describe what you know about the problem," or "Have you

noticed any problems since my last visit?” This type of question gives customers a chance to share their information. That could trigger other questions that might guide your inspection.

You’ll develop your own interviewing style, but here are some questions to probe for specific information. Ask the customer, when did you first notice this problem? How often does it happen? Did you see any animals or any signs of animals? You might want to prompt them, by asking whether they’ve heard noises, for example. Then be sure to find out if the noises are heard during the day or at night. Can they locate the noise? You may want to ask several questions about the noises they’re hearing, because sometimes people mistake mechanical sounds such as the beeping of a smoke alarm that has a low battery or a swaying utility line for animal noises.

Remember to ask if they’ve ever had any trouble with wild animals before. If they say yes, have them describe that situation in more detail. When did it happen, did they identify the culprits, and what did they do?

There are also a few important questions to ask about the household. Are there any children or pets present? That might limit which wildlife control techniques you choose. Did anyone have any direct contact with the wild animal? What about pets? This is especially important if dealing with bats, raccoons, and skunks, the species in our area that are most likely to carry rabies. If there’s been contact, you’ll have to follow health department guidelines. That’s the law.

## Inspection

Before you can confirm the problem and contemplate solutions, you’ll usually need to inspect the property. Take a good look at the whole landscape, and the neighborhood. This is the big picture that could explain why the problem developed. With the added information from an inspection, an experienced observer can provide management options for problems associated with uninvited animal guests.

Follow appropriate safety precautions throughout the inspection. Before you start your inspection, think about the space you’re entering and the typical hazards associated with it. In an attic, you might worry about heat stress; ladder accidents; airborne diseases stirred up from rodent, bat, or bird droppings; and scratches

from nails that might expose you to tetanus. Heat stress and airborne diseases are also concerns when entering a crawlspace, but you may not encounter nails or need to use a ladder. (See chapter four).

Find out where the property lines are, and whether the caller owns or rents. If it’s a rental, talk to the property owner or manager to secure permission. (If the renter refused to pay, the managers might not be willing to if they didn’t authorize the work.)

During your inspection, you might focus on the specific problem area but there are some benefits to inspecting the entire building or property. A “problem-specific” inspection takes less time and addresses your customer’s immediate concern, but a more thorough inspection may identify other problems that your customer doesn’t know about. For example, you might be called for raccoons in a chimney and find that the animals have also entered the attic. Or maybe they haven’t made it into the attic, but you suspect it’s only a matter of time because the type of roof vent on this house is very vulnerable to raccoon damage. Rotted soffits, trim, and roofs are also vulnerable to animal entry.

A thorough inspection will also reduce the likelihood of overlooking some aspect of the current wildlife problem. What if there’s more than one species involved? Even if the customer didn’t ask you to look for that, they might not be happy if you missed it.

### Detective tools (inspection equipment)

- good flashlight with extra batteries and bulb
- small, flat pry-bar
- stepladder, larger ladder
- binoculars (useful for tall buildings)
- mirror, TV camera, or fiber optic scope attached to a long, flexible pole (for viewing hard-to-see areas such as wall voids)
- ultraviolet light for detecting rodent urine stains
- digital or instant camera (so you can show your customer exactly what you found)
- inspection form for recording information
- identification guides, including those that show animal sign (tracks, scat, nests)
- plastic bags for collecting animal sign (to show evidence to customers)

*"I had a job where a raccoon was living in one of two spaces in the attic of a large house. If I'd limited my inspection to the area where the customers regularly heard the raccoon making noise, I would have missed the actual entry site. This raccoon got into the building through a hole that wasn't visible from the outside. Then it traveled through a small wall void into the second crawlspace area, where it was most active."*

—Lynn Braband, former NWCO in New York

Take pictures during the inspection, using a digital camera or instant camera so the images are available right away. It's much easier to explain the situation to your customers if you can show them pictures of the damage, the animal sign, and the entry holes. In fact, you may want to create a photo album that shows structural problems, typical animal damage, management options, and prevention techniques. That's a handy resource to keep in the truck. Consider offering fact sheets to customers, too. This could save you time while reducing the odds of misunderstandings. (Make sure the information is reliable! Dependable sources include the state wildlife agency, health department, and Cooperative Extension.)

It's just as important to take notes during the inspection. Write down your management recommendations, either on the inspection form or the contract. Give the customer a copy of the inspection report and remember to keep one for yourself. Once you've reached agreement on the approach, you and your customer may want to sign a contract that clearly describes the work, your fees, and terms of payment. Many NWCOs also collect a deposit at the beginning of a job, although this is usually most practical with private individuals. Different arrangements are often made with corporate accounts.

Another tip that may save you time later is to be systematic as you conduct your inspection. It's easier to remember whether or not you've checked a particular area if you always work in the same pattern. After you've done a few inspections, you'll develop your own style. Here's an example of a thorough inspection of a building for existing or potential wildlife problems.

Start inside the building at the top and work your way to the bottom. Within each room, move either clockwise or counterclockwise. Pay special attention to the corners, and spaces underneath and behind furniture. If there are suspended ("dropped") ceilings, push up the panels in a few places to check above the ceiling.

Best practices for solving a wildlife problem, step-by-step

### 1. ASSESS THE SITUATION

- interview
  - inspection
2. Choose management options
  3. Do it (tools and techniques)
  4. Prevent future problems
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Inspect attics; basements; the areas underneath sinks; the places where pipes, cables, and wires enter the building; and crawl spaces. Look inside closets and built-in drawers.

Use light to your advantage. During the day, turn off the lights and look for places where the daylight shines through walls and floors. If light can get through, so can some small animals.

Once you're done with the inside of the building, move outdoors. You can use light to your advantage here, too. At night, turn the lights on, then go outside to see if there are places where the lights shine through the walls or roof. Again, start at the top and work your way down. Use binoculars for a good view of the roof.

What's the condition of the eaves, dormers, windows, vents, ledges, chimneys, and roof corners? Animals often gain entrance at joints and places where different building materials meet. Give careful attention to the foundation, because that's a vulnerable area. Check beneath decks, porches, and crawl spaces. Don't forget the garage; barns; sheds; the places where they store garbage cans; dumpster areas; compost heaps; and piles of firewood, lumber, or junk.



#### **One size does not fit all!**

Your chosen strategy for dealing with these beavers might change dramatically depending on the site and the needs of the customer.

For example, beavers may not be tolerated at all in a reservoir used to supply the town's drinking water, while the same level and type of activities might not bother a private landowner. Each nuisance wildlife situation presents different challenges and requires a customized solution.



### Higher, deeper, further...

- Ask a friend to pretend to be one of your customers. Interview your friend about the problem, then inspect the premises and share your advice.
- Jot down a few questions you might ask customers that would help you identify which animal is causing the damage.
- Go to a bookstore or library to browse through the latest field guides to animal signs.
- Visit a zoo or nature center that exhibits some of the animals you might encounter in your job. Spend some time watching them. Close your eyes, and pay attention to the odor. Talk to staff about the species' habits. How would they know if that critter was present?
- Start your own wildlife sample charts, to help you identify species by their fur, feathers, or shed skins. You can collect samples from the animals you trap.

## Summary

Before you answer the review questions, you may wish to think about the learning objectives:

- 5.3 *Describe two benefits of doing a thorough inspection.*
- 5.4 *Give an example of a question you'd ask to figure out whether a problem was caused by a raccoon or a squirrel.*
- 5.5 *Describe four kinds of animal sign that you'd look for during an inspection.*
- 5.6 *Your knowledge of wildlife habits helps you estimate how many nuisance individuals may be present—before you even get to the site. Describe two biological facts that led you to this conclusion.*
- 5.7 *You've just noticed something that's going to change the way you deal with this situation. What was it?*

## Review questions

- 3. You're called to a home to deal with a rodent problem. Your customer has three dogs and a toddler. That makes you think:
  - a) No wonder the place smells
  - b) I should attach the mouse traps to beams, where

- the dogs and the child can't reach them
  - c) Why aren't these lazy dogs taking care of the mice?
  - d) I could set out live traps, which would be safer for the kid
  - e) Answers "b" and "d" correct
  - f) Answers "b," "c" and "d" correct
- 4. When you first talk to your customer to gain information about the nature of the wildlife conflict, you might ask:
    - a) "What can you tell me about this problem?" and "Why didn't you call earlier?"
    - b) "What's going on?" and "Can you pay for this?"
    - c) "What have you seen and heard?" and "When do you notice the problem?"
    - d) Very little, because they always lie
  - 5. There's a noise in the dropped ceiling. Your customer's not sure what it is, but you know it could be a rodent or a bird. Your truck is packed tight, so you want to make sure you bring the right equipment for the job. What question do you ask her?
    - a) When do you hear the noises, during the day or at night?
    - b) How loud is it?
    - c) Where are the noises coming from?
    - d) You mind if I leave this skunk in your driveway while I finish up my route? That would make it easier for me to fit everything into my truck without going back to the office.
  - 6. Your customer just bought an old house. They've been told there's a bat or two in the attic, but they were too scared to check. They want to know how many are up there, and have them removed before they move into the house, which they're planning to do the first week in July. Because you're the wildlife Sherlock Holmes, you tell your customer you'd be glad to help, but:
    - a) This time of year, there's a good chance there's more than one or two bats in the attic. There could be a whole colony of females raising their young.
    - b) You can start now, and make sure that the bats can't get from the attic into the living spaces. But you'd like to let this batch of young leave on their own, which they'll do by mid-August. Once they're gone, you can finish bat-proofing the house.
    - c) The bat's probably long gone. Don't worry about it. You'll never go into the attic, anyway.
    - d) Answers "a" and "b" are correct.

7. You think there's a mammal in the office. While inspecting the kitchen, you'd look for these signs (check all that apply):

- \_\_\_ gnaw marks on the cabinets
- \_\_\_ droppings in drawers and by the kickboards
- \_\_\_ smudge marks on the baseboards
- \_\_\_ urine stains on walls and woodwork
- \_\_\_ holes chewed in cereal boxes and other stored foods
- \_\_\_ burrows
- \_\_\_ piles of nuts and seeds in a cabinet that's not used often
- \_\_\_ odors
- \_\_\_ fur
- \_\_\_ tracks
- \_\_\_ noise
- \_\_\_ the creature
- \_\_\_ pets scratching at a wall
- \_\_\_ livestock remains
- \_\_\_ broken egg shells
- \_\_\_ nest
- \_\_\_ crop damage

*Answers:*

3: e

4: c (these questions will help you identify which species is present. Some of the questions address reasonable concerns, but in a tactless manner.)

5: a (rodents and birds might be active in some of the same places. Most birds are diurnal. All of the ones most likely to cause problems in homes are. Rodents may be active at night, too).

6: d

7: Most of these signs are made by rodents, except for livestock remains, broken egg shells, and crop damage, which you wouldn't expect to see in a kitchen. Rats do burrow, but usually outside.

Best practices for solving a wildlife problem, step-by-step

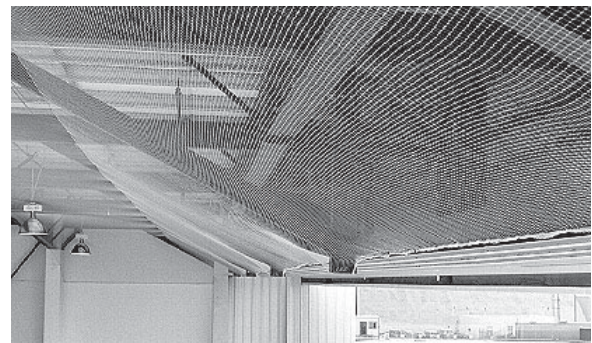
**1. Assess the situation**

- interview
  - **inspection**
2. Choose management options
  3. Do it (tools and techniques)
  4. Prevent future problems
  5. Evaluate success



You can often turn a vulnerable site into a darn good fortress by installing a barrier around it. Netting works both indoors and out. At left, a flat rooftop and satellite dish are protected under netting, which works equally well inside the warehouse below, to keep birds from roosting on the rafters.

If your customer worries about how things will look after you're done, netting may be a good option because it's hard to see, especially from a distance.



## STEP TWO: CHOOSE MANAGEMENT OPTIONS

### *Learning objectives*

- 5.8 *Describe the options for managing a wildlife conflict.*
- 5.9 *Explain one way you'd make an area less attractive to nuisance wildlife by actually changing the environment, and one way you'd do this by changing people's habits.*
- 5.10 *List two of the factors that influence the effectiveness of repellents.*
- 5.11 *Which management option would almost always be a part of your solution? Why?*

At this point in our story, Sherlock would retreat to his apartment, pick up his pipe, and think. So many clues, so many possible solutions: how do you choose?

With a proper species identification, the information you learned during your interview and inspection, and your knowledge of that animal's life history, you can estimate how many individuals might be present. Again, this will depend on the time of year (is it breeding, rearing young, hibernating, or migrating?), and the animal's social habits. Woodchucks are generally solitary, while bats are social and are often found in colonies. Is this animal territorial? Will it drive away others at certain times of the year? Does it have a large home range? If so, it might not be able to meet all of its needs just on this site. That could be tricky, because that might mean that the best solution would include addressing a situation on someone else's property, too, and you might not be able to do that.

All of this detective work is meant to help you decide how many individuals this site would naturally support. Of course, there could be other factors at work here, and you need to take that into account, too. If someone is feeding the wildlife you could encounter unbelievably high population levels, way beyond what the books suggest.

As you consider those questions, you may eliminate some control techniques because they're not practical, safe, or discreet enough for this situation. Legal restrictions may eliminate some options. The presence of free-roaming pets, children, or protected wildlife might also lead you to favor some approaches and avoid others.

Okay, you're ready to decide on a management strategy. We'll discuss each major strategy now, and then, in step three, will describe the common techniques used to achieve that method. In some cases, there are many different ways to attempt to achieve a particular strategy. For example, we'll describe more than a half-dozen ways to remove an animal from a site.

### **What are your options when confronted with a nuisance wildlife damage situation?**

- **Do nothing. Let the problem resolve itself.**
- **Make the environment less attractive.**
- **Scare the nuisance animal away.**
- **Remove the culprit.**
- **Reduce the local breeding population.**
- **Keep the animal out (exclusion).**

Regardless of which strategy you favor, keep these few points in mind. First, a combination of techniques almost always works better than relying on one method. Be as selective and discreet as you possibly can. Proper timing will increase your success rate (you wouldn't try to trap a nocturnal animal during the day, would you?) Take advantage of the species' vulnerabilities and habits, too. And watch out for risky conditions.

### **Option: Do nothing. Let the problem resolve itself.**

#### **Techniques: Education and persuasion.**

Talk to your customers, so they understand why this problem developed and what's likely to happen next. The best thing to do may be—nothing.

For example, American robins may attack windowpanes for a few weeks during the early spring, as they establish their nesting territories. The birds attack their reflection in the glass, because they mistake it for an intruder who's threatening their territory. But they'll stop soon. Many people will be satisfied to wait it out, once they realize the problem will go away on its own. If someone can't tolerate the noise, you can use your knowledge of animal behavior to suggest an easy fix: cover the window to reduce the reflection. If the



robin doesn't see the "intruder" (which is just its own reflection) then it won't have a reason to defend its territory. (Quite a few problems with migratory birds take care of themselves within a few weeks.)

We all have our moments. It's easy enough to work yourself into a bit of a frenzy over something that's not such a big deal, or not even true. For example, many people believe "drooling = rabid animal." Yet healthy opossums drool and shake as part of their defensive behavior, and this species doesn't often catch rabies. In such a case, sharing correct information may make a "problem" disappear.

If someone doesn't know much about wildlife, how can they evaluate the situation sensibly? They lack information and the context for understanding it correctly, which you can provide. Perhaps you can handle this over the phone and save yourself the trip.

There are many times when this "zen" approach is common sense. As soon as the snow melts, you'll probably get calls from people concerned about moles or voles ruining their lawns. There may be tunnels all over the place! But there's a good chance that this clue is all that's left. Both moles and voles change their habits seasonally. These tunnels are the sign of their *winter* activity. They may have left the area. It's much more sensible to wait a little while to see if there's evidence of new damage.

Sometimes, by the time you've arrived, the problem is fixed. Maybe a bat entered a room through a torn screen and has already escaped. You may only need to explain the cause of the problem and how to prevent repeats of this scenario. Consider creating a short tip sheet to explain the predictable problems. This could save time on the job. Instead of your long explanation, hit the high points and leave the customer with the written details.

**Option: Make the environment less attractive to the culprit.**

**Techniques:** Remove food sources; keep buildings in good repair; protect vulnerable areas with barriers; maintain a tidy landscape; move livestock to protected areas; switch to landscape plants that the nuisance animals find less tasty.

Best practices for solving a wildlife problem, step-by-step

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    - Reduce the local breeding population.
    - Keep the animal out (exclusion).
3. Do it (tools and techniques)
4. Prevent future problems
5. Evaluate success

What do most wildlife seek when they invade our spaces? Food and shelter, especially safe places to raise their young. They may also be enticed by water and places to just hang out or loaf.

If you can remove those enticements or change them so they're not as appealing as they were before, you may be able to solve the problem for good. This approach is known as "habitat modification." Although it's sometimes more expensive up front, the long-term payoff is usually good because this gets at the root of the problem. Sure, you can just trap and remove an animal. Year after year after year... that adds up.

There are scientists and NWCOs who believe that some animals, such as raccoons, learn to recognize a good deal. Once a nuisance, always a nuisance, they say. It's even possible that the young of a female who



People unintentionally feed wildlife. Spilled bird seed, pet food left in dishes outdoors, and garbage can become buffets for a variety of wildlife from rodents, bears, foxes, raccoons, to skunks.

When people intentionally feed wildlife, they can cause or worsen other problems. The gulls shown in the parking lot below may well mob people who try to feed them. Their droppings may foul cars.



has such habits learn to take advantage of the riches we provide because of their experiences with their mother. If true, then the quick-fix approach could be even more costly than we imagine.

Some of the most profound ways to modify a habitat may only involve persuading people to change their habits. For example, here's a no-brainer for customers annoyed by bears that raid the bird feeder during the late spring and summer: don't feed the birds during those seasons! Feed birds only during the winter, problem solved.

More examples: raccoons tipping over the garbage cans and making a mess? Store the cans in a protected area. Or hang the cans on a hook above ground so they can't be tipped over (make sure the coons can't climb up the pole or wall to reach the garbage can). If possible, put the trash out right before it's due to be collected. Has the compost heap turned into a restaurant for skunks, opossums, rats, and raccoons? Install an animal-proof compost bin (For information, consult Cooperative Extension's "Master Gardener" program). You'll find a host of suggestions in each of the species accounts.

Many wildlife species prefer to use the same path to food, shelter, water, and loafing areas. Can you block that route, or make it unpleasant? Canada geese, for example, love mowed grass. Let the grass bordering the pond grow longer to discourage the geese from using the site. Eliminate ponds from malls and business parks, and you can really make them miserable. This general idea works for many species. If a tree branch overhangs a roof, trim it 8–10 ft. away, and the most acrobatic squirrel won't be able to make the leap anymore.

Other ways to change the conditions of the habitat may require efforts on a grander scale. Take a few tips from farmers, who combat pests by tilling, rotating crops, controlling water levels, and heating up the soil. Can you change the temperature, water level, or amount of light that reaches an area? Bats like warm, dark places. If they're roosting behind shutters, put a block between the shutter and the siding. This holds the shutters further away from the wall and exposes the bats to drafts and more light. That might convince them to move on.

If wildlife dine on flowers and shrubs, consider switching to plant varieties that they don't find as tasty.

For a list of plants that are more resistant to deer, see the Cornell fact sheet, *Resistance of Woody Ornamental Plants to Deer Damage* (citation in resource section).

#### Option: Scare the nuisance animal away.

**Techniques:** Use of visual repellents (strobe lights; lasers; mylar tape; balloons) use of noisemakers; (distress and alarm calls; pyrotechnics; sirens) hazing (with predators or radio-controlled craft); use of guard animals. NWCOs with a commercial pesticide applicator license can also use a variety of chemical repellents.

"Run 'em out of town." That's the idea of this method. But it's easier said than done. To make this work, think like the animal. What scares it? If you rely on something the animal doesn't experience in nature, the technique may not work because it's not meaningful to the animal. (An envelope from the IRS may send some people into hiding but it wouldn't faze starlings. Now that's obvious, but many frightening devices fail for just this reason. They don't make any sense to the species they're supposed to scare.)

Repellents are objects, substances, or techniques that repel, or drive an animal away. There are several kinds: scare devices; chemical repellents (which can only be used by NWCOs with a commercial pesticide applicator license); and guard animals.

Repellents either frighten the animal away or make the desired object, such as a crop or nesting site, intolerable by making it smell or taste nasty, or feel bad to the touch. Animals may be "hazed," or driven away from a site, when chased by predators (dogs, falcons) or vehicles (radio-controlled planes, boats).



See the mothballs to the left of the rocks? Not exactly repelling the skunks, are they? Repellents often work better when several are used together, in an unpredictable fashion. They're generally better at preventing a new behavior than stopping a well-established habit.

Many repellents are meant to frighten the wildlife away. These include scary-looking objects, such as mylar tape, strobe lights, models of predators, and “scare-eye” balloons; noisemakers, such as propane cannons, bangers, clappers, crackers, and distress calls; devices that combine lights and noise to scare animals; and the use of guard animals, such as dogs, that chase wildlife.

Sometimes, frightening techniques fail for a very basic reason: the animal can’t hear or see the thing that’s supposed to scare it. Oops. This is why ultrasonic devices don’t work on birds. They can’t hear them.

Again, to avoid this mistake, think like the animal. Which senses does it rely on most: smell, sight, hearing, taste, or touch? How do individuals warn each other of danger? Beavers noisily slap their tails while deer flash theirs, a quiet but highly visible warning. Birds often rely on sight and sound to detect danger, while mammals rely more heavily on odor cues.

Another biological factor that influences the effectiveness of some repellents is the nervous system. Birds and mammals are wired a little differently so they perceive the world differently. Capsaicin, the active ingredient in hot peppers, burns the mouth, eyes, and nose of mammals. Hot hot hot! Not so for birds. They are insensitive to capsaicin, so they ignore it. On the other hand, birds find methyl anthranilate, a sweet grape flavoring, highly irritating.

Distress and alarm calls, hazing with live predators, and objects that mimic the animal’s real predators, are often more effective than many other frightening devices because they make more sense to wildlife. Animals naturally fear predators, for good reason. Given time, many animals learn that other scary objects actually pose no danger to them, so they ignore them. That’s why these devices are often useful for only a short time.

Chemicals are used to repel wildlife, too. But unless you also have a commercial pesticide applicator license, you can’t use them in your NWCO business. Chemical repellents are classified as pesticides. If you do have this license, remember to check each product to make sure it’s registered in the state, and for use on that species, and in the way you’d like to apply it. Read the label carefully, because the label is the law.

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A variety of commercial chemical repellents are available especially to reduce mammal browsing in orchards and vineyards, and on nursery stock and ornamental plants. Most products are registered for deer and rabbit control on non-food crops and ornamentals. (For more information, contact your regional DEC office and speak to Bureau of Pesticides staff). Quite a few home remedies, such as soap and baking soda, have repellent properties. Likewise, concoctions made from plant extracts such as mint, citrus peel, or marigolds may act as repellents as well as pesticides. But home remedies are out-of-bounds for NWCOs; they are not legally registered products.

Repellents can be a valuable addition to your strategy. This nonlethal technique saves you the trouble of capturing or handling wildlife—when it works. Your best chances are to try them when these three things are true: there’s only light to moderate damage; the site is small; and a few applications should provide adequate control.

**Option: Remove the culprit.**

**Nonlethal techniques:** Direct capture; use of live traps, one-way doors, or repellents.

**Lethal techniques:** Use of lethal traps; shooting. NWCOs with a commercial pesticide applicator license may also use a variety of pesticides.

*Note: Once the animal is captured, it may be released; transferred to a wildlife rehabilitator (if it’s injured or orphaned); or killed. In addition to the techniques mentioned above, there are other appropriate methods for killing wildlife, such as the use of a carbon dioxide chamber, which are described later in this chapter. These techniques and tools do not aid in the capture or removal of that animal from the site so they’re not listed above.*



There are several methods for removing animals from areas in which they are unwanted. Nonlethal techniques include direct capture using a hand-held device or net, and the use of one-way doors or live traps. Lethal methods usually involve lethal traps, shooting, or pesticides. Obviously, some techniques are better suited for some animals than others. With all of these methods, be aware of the possible presence of young so you don't create wildlife orphans.

Whether you've chosen a nonlethal or lethal removal technique, you'll be faced with the same question: What will you do once you've caught the animal(s)? In chapter two, we suggested that one of the major questions NWCOs should consider is the possible ecological consequences of each method. You have three basic choices once you've captured an animal: you can release it on site; you can transfer it to a new place, or in some cases, to a wildlife rehabilitator or licensed facility; or you can kill it.

### **On-site release**

Releasing the animal on site generally causes the least stress to the animal. It may be a best practice for your customer's situation, but it requires some consideration. For example, if the animal is obviously sick or may have exposed someone to rabies, stop right here. In those cases, releasing the animal would be risky (and possibly illegal).

Before you release an animal, consider the possible effects on the animal, your customer, your customer's neighbors, and local wildlife populations. Unfortunately, this hasn't been well-researched yet and as you'd expect, it's a hotly debated point. Is it ethical to potentially pass your problem on to the neighbors? Is it humane to release an animal if its survival chances aren't good?



In this condominium complex, raccoons moved from one cupola to the next. Notice the bent louvers.

Here are a few guidelines that may help you resolve this point as we wait for solid evidence. First, consider which species caused the problem. Bats and snakes cannot create openings in buildings. Remove them, then repair the hole that let them in, and they're not likely to trouble your customer again. They can't force their way into the neighbor's building, either. So on-site release is almost always appropriate with these species. In fact, it's actually preferred. Both bats and snakes congregate, which means that the individuals at that one site may represent a good percentage of the local population. What you do at this site could have broader effects than it would if you were dealing with a species whose population is more dispersed. (Please read the bat account for some additional factors to consider when dealing with large colonies.)

Now, let's apply the same logic to the great chewers: mice, rats, squirrels, raccoons. They can most definitely chew their way back into the building. If the nuisance animal has developed the habit of using a building it may become a repeat offender, especially if den sites are rare, or the animal is ready to give birth and needs a den right away. The ethics of this situation are less clear.

Look around the neighborhood. If the nearest building is miles away, then the risk of the animal troubling the neighbors could be low. If it's a condo complex of attached buildings which all share the same deficiency that allowed the animal to gain access, such as poorly designed louvers, it's much more of a concern.

There are two circumstances in which on-site release is almost a no-brainer: the accidental capture, and the accidental entry. Say you're trying to catch a skunk but you find an opossum in your cage trap instead. Open the door and let it out. It's not causing any damage; it's not a nuisance; it's just in the wrong place at the wrong time. Likewise, animals sometimes end up inside buildings accidentally. Birds and squirrels sometimes fall down chimneys. Bats will sometimes enter a building through an open window or door. If the animal poses little risk to nearby people, you should be able to capture it and release it outdoors. Help your customers understand how to prevent another animal from dropping by (maybe you'd offer to install a chimney cap, for example). Done. Everybody happy.

On-site release, especially if coupled with effective exclusion that will prevent the animal from re-enter-

ing the building, may be a good solution for your customer's problem. Use your professional judgement.

### **“Trap and transfer” (a.k.a. “relocation”)**

If an animal is sick or injured, a NWCO may be able to transfer the animal to a wildlife rehabilitator. Even NWCOs who are very careful to avoid orphaning young animals may sometimes find themselves with a litter that's been separated from its mother. Wildlife rehabilitators may be able to help. Of course, it's better to have a good relationship with your local rehabber before you need that person's services. To find licensed rehabbers who work in your area, contact your regional DEC wildlife staff or New York's association of rehabbers, the Wildlife Rehabilitation Council, or check their website at [www.nyswrc.org](http://www.nyswrc.org).

In most cases, when people refer to “trap and transfer,” they don't mean turning the animal over to a rehabber, they mean moving the animal to a new place. This is a common but controversial technique. While solving some of the problems associated with releasing the animal on-site, it raises other concerns.

Let's try our six best practices questions from chapter two on this technique.

#### *1. Is it safe?*

Reasonably so. Trap and transfer involves transporting the animal, which is stressful, so the animal may be quite agitated when you're ready to let it out.

#### *2. What are the likely ecological consequences of this action?*

- Can spread diseases through wildlife populations.
- An area can only support so many individuals of a particular species. Raising the level of competition for food, shelter, and den sites (at the release site) could hurt more animals in the long run.

#### *3. Is it practical?*

- At best, we can say “effectiveness unknown for nuisance species.”
- If the customer opted for capture and relocation without exclusion, chances are good that the problem will happen again. A new animal will usually quickly replace the one that was removed.
- The relocated animal may return to the site. Many animals have strong homing instincts. A male raccoon, for example, can travel as much as 5–10 miles each night. Bats routinely travel hundreds of miles to their hibernacula.

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- Is there a suitable release site close by?
- Can you afford to make the time to take the animals to the site?
- You'd need to secure the permission of the people who own the land that you'd like to use as a release site. On public land, you'd need the permission of the land manager. Can you get permission in time? What if you're refused?

#### *4. Is it humane?*

- How well does this species respond to transport? Will the animal be so stressed by the process that it's unlikely to survive, anyway? Studies have shown that the stress and trauma of capture causes some animals to die a few weeks later.
- What are its chances of finding a new territory? The animals that are already established in the release site may drive off or attack this animal. Between the capture, transport, and release in a foreign locale, this animal is probably already stressed. Does it stand a chance?
- What are its chances of finding food? During the winter, when food is scarce for many of these species, placing an animal in an unfamiliar place can cause it to slowly starve to death. This is especially true if that animal would normally rely on stored food to make it through the winter, as squirrels do.
- Add to the troubles: what if this is a mother with young? Would she simply abandon or kill her young because she's already been too stressed? If not, will she have time to find food, shelter, and a safe place to raise her young?
- Some animals are killed by cars, dogs, or other predators as they try to return to their original homes through unfamiliar territory.

### 5. Is it legal?

- This technique is legal for NWCOs (assuming, of course, that they have the permission of the owners of the release site), but not for the general public. Many people don't realize that.
- Is the animal classified as a "threatened" or "endangered" species, either on a statewide or national basis? If so, stop! You cannot handle it in New York State. Do not harm it or its habitat.
- Pigeons wearing leg bands are also out-of-bounds for NWCOs in New York.
- Are you dealing with a migratory bird? Nearly all are protected by the Migratory Bird Treaty Act. You'd need federal and state permits, which would spell out approved techniques. Follow your permits.
- Is the animal classified as an "unprotected" or "protected" species in New York State? If it's a protected species, refer to the Environmental Conservation Law, which describe the situations in which you can "take" (or kill) that species. That information is included in the species accounts in the appendices.
- You are talking about wildlife, right? Because your NWCO license does not give you the authority to handle feral cats or dogs, or livestock, such as domestic ducks. Those species are covered by other laws.
- Once you've established that you can legally take that species, check local laws. The use of some tools such as "dart guns" may be restricted in some areas.
- During times of disease epidemics, there may be restrictions on moving animals. You still have to follow DEC and Department of Health guidelines.

### 6. How would your actions play on the evening news?

This is hard to predict. So far, there haven't been enough scientific studies to answer some of the important ecological questions raised by this approach. We can't say whether this is likely to be a "happily ever after" story for the relocated animal, or a tear-jerker. How will people who live near the release site feel?

Is this technique all bad? (If it was, would it be in this manual? Really.) Wildlife biologists relocate animals. This technique has been used to reintroduce wildlife into areas where they were once found, for example, or to stock certain areas with game species, such as wild turkey. But when it comes to nuisance wildlife, the usefulness of this technique is debateable. Your customers may request this option, so you'll need to think about it.

Should you decide to relocate an animal, there are several things you can do to give it the best possible chance of survival. Find an area with suitable habitat for that species, with good and varied sources of food and shelter. Release the animal during the time of day when it's naturally active, for example, release a nocturnal animal at dusk or in the evening, not in the middle of the day. Keep families together and release them into a covered area, such as a culvert or hollow log; this will increase the chances that the mother will stay with her young. Follow the guidelines for preventing orphaning (see step three). And don't overload an area.

### Killing the captured animal

You may choose to avoid relocating animals by refusing to offer that service, but as a NWCO, if you handle mammals, you must be prepared to kill wildlife, in case a rabies test is needed. You are legally required to follow the directions of the DEC and the Department of Health. Most people understand and support measures taken to protect public health and safety. What about other circumstances?

Like relocation, this technique is also controversial. Here's how it stacks up as a best practice.

#### 1. Is it safe?

Care and skill are required when using a lethal technique, even one that's commonly used by the general public, such as setting a mouse trap. Consider the risks to people—including yourself—and those to other wildlife, pets, and livestock. The risks vary depending on the technique. For example, a carbon dioxide chamber doesn't pose a risk to other species because you control which animal is placed inside it. Killing methods are described later in this chapter, with details about safety.

#### 2. What are the likely ecological consequences of this action?

Most of the species described in this manual are thriving in New York. Their populations are rising, which is one of the reasons why they're more likely to come into conflict with people. In most cases, you would be removing a small number of animals and wouldn't significantly affect local populations. However, if you're faced with a large bat colony or a snake hibernacula, this is an important concern. In those cases, if possible, choose a combination of non-lethal methods.



Some lethal tools, such as pesticides and lethal traps, may pose risks to other species. That's why they must be used carefully and are not appropriate in all cases. For example, if there are endangered or threatened species in the area that might be accidentally captured, a nonlethal capture method may be better. Yet, some lethal methods are so selective that they wouldn't threaten some endangered species. For example, some snap-back traps don't pose a threat to bald eagles. Consider the circumstances.

### 3. Is it practical?

If you've correctly diagnosed the situation, killing the nuisance animals will stop the problem—at least for a while. If the customer opted for removal without exclusion, chances are good that a new animal will take advantage of the situation. On the other hand, if the customer opts for removal using lethal techniques and exclusion, then you've provided a long-term solution without the risk of passing the problem on.

### 4. Is it humane?

This is an important topic that will be discussed in much greater detail later in this chapter. In each species account, we've described preferred and acceptable killing methods for that species. Use a preferred method whenever you can. You must match the technique to the species. For example, the use of a carbon dioxide chamber is not recommended for beaver, diving birds, or reptiles, because those animals can hold their breaths for a long time, so that method wouldn't kill them quickly enough.

### 5. Is it legal?

- Can you legally take that species? (Points 2–6 under the “is it legal?” discussion for trap and transfer also

Goose roundups are an example of a special culling operation.

They're most effective when the geese are molting and can't fly. Top: If the birds are on the water, people in boats drive them onto the land. Then others walk behind the geese to direct them towards the pen. Bottom: These temporary enclosures usually have a funnel-shaped entrance that guides the birds inside.



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apply to the use of lethal techniques. Those points describe species that you cannot take.)

- Check local laws. Some lethal techniques, such as shooting, for example, may be restricted in some areas.

### 6. How would your actions play on the evening news?

- Think about this question long and hard—especially when you're using lethal techniques. The best practices approach provides a solid framework for making decisions about nuisance wildlife situations. Don't just give it lip service. Think before you act. Imagine that video camera is recording at all times. (Smile.)
- Be sensitive and savvy. Work in private. Some of the killing methods described in this manual look gentler than others. If you have to kill an animal in front of observers—which you should avoid doing whenever possible—take a moment to explain what you're about to do, and why you've chosen this method for this species in this situation.

#### Option: Reduce the local breeding population.

Techniques: Regulated hunting and trapping seasons; and special culling operations (permits may be needed).

*Note: Some communities currently participate in research programs to test wildlife birth-control and sterilization techniques. These techniques are not yet proven, nor are they commercially available.*

With most of the species handled by NWCOs, the focus is on an individual problem that generally affects a small area, such as one person's home. Some species, such as Canada geese and white-tailed deer, may cause problems for an entire community. In this case, one

aspect of the solution may involve reducing a breeding population. This is often done through regulated hunting and trapping seasons or special culling operations of adults, eggs, or young. Such efforts are usually planned by wildlife biologists, but some NWCOs participate in the project, so we'll give you an overview of the method.

These approaches can be biologically, socially, and legally complex. They require community support and government oversight, and are usually beyond the normal scope of NWCO activity. The group in charge of this major effort may hire NWCOs to provide specific services, such as addling eggs.

Scientists are experimenting with birth control techniques for wildlife. This hasn't yet proved generally effective for controlling populations, but contraceptive and sterilization methods are being tested in a wide number of species on a small scale. (To learn more: Fagerstone, K.A., M.A. Coffey, P.D. Curtis, R.A. Dolbeer, G.J. Killian, L.A. Miller, and L.M. Wilmot. 2002. *Wildlife fertility control*. Wildlife Society Technical Review 02-2, 29pp.)

The bottom line for the average NWCO: you may not even want to get involved in special culling operations, but you can encourage landowners to allow hunting and trapping on their land, especially if they're dealing with nuisance wildlife. This may be one of the most effective ways to solve problems with beaver, muskrat, raccoons, squirrels, and deer, for example.

#### Option: Keep the animal out of the area (exclusion)

**Techniques:** Repair buildings to seal entry holes; protect vents, louvers, and sewer pipe vents with animal-proof designs or add screens or shields; cap chimneys; fence outdoor areas; use netting, spikes, electric shock devices, or plastic strips to keep birds away from alcoves, ledges, and other perches; erect "post-and-wire" grids over large areas to discourage birds from landing there. For more information, see step four.

There's one strategy that should almost always be used as part of your solution: exclusion. In some cases, you may be able to solve the wildlife conflict by putting up a barrier that keeps the animal away from the vulnerable area, whether it's a garden, child's sandbox, orchard, or the foundation of a building.

Exclusion is one of the best ways to prevent nuisance wildlife conflicts. It can stop repeats of the problem, and may even prevent other conflicts from ever happening. And it will probably increase the effectiveness of other strategies, such as habitat modification, the use of repellents, and the removal of the nuisance animals.

When you can, persuade your customers to take advantage of your wildlife expertise and knowledge of building construction by hiring you to make their properties "animal-proof." Perhaps you only want to make recommendations, or maybe you're happy to do the actual repairs. In either case, you probably know more about which exclusion products to use and how to install them correctly than the average building contractor.



There are many exclusion products on the market. Top: A chimney cover will keep many animals, such as birds, bats, squirrels, and raccoons from getting into a chimney.

Middle: This net is hung over a pond or field to discourage birds from landing in the area.



Bottom: Here's an example of an exclusion device that most NWCOs custom-fit to the site. It's called a "rat wall." This "L"-shaped fence can be installed as a free-standing barrier or attached to a porch, shed, or stairs, as it is here.



The bottom is bent into a shelf that keeps animals from digging underneath it. In this photo, you can see the bottom, but not the top, which is attached to the concrete. Once it's covered with soil, it won't be noticeable at all.

### Higher, deeper, further...

- Survey your NWCO friends to find out which management strategies they use most often. Are they happy, or do they wish they could change things?
- Find out if any nearby communities are actively trying to control white-tailed deer or Canada geese. What's happened so far? How is it working?
- Search the web for fact sheets that explain why some temporary wildlife conflicts happen (such as robins pecking at windowpanes, or woodpeckers drumming on gutters). Create a file to help you respond to customer questions.

## Summary

Before you answer the review questions, you may wish to think about the learning objectives:

- 5.8 *Describe the options for managing a wildlife conflict.*
- 5.9 *Explain one way you'd make an area less attractive to nuisance wildlife by actually changing the environment, and one way you'd do this by changing people's habits.*
- 5.10 *List two of the factors that influence the effectiveness of repellents.*
- 5.11 *Which management option would almost always be a part of your solution? Why?*

## Review questions

- 8. To make an area less attractive to nuisance wildlife, you might persuade your customers to:
  - a) keep the area around the bird feeder clean
  - b) remove dog feces from the yard every day
  - c) store the trash cans in the garage, then put them out right before the trash pick-up
  - d) all of the above
- 9. To make a park less enticing to Canada geese, you advise the city officials to:
  - a) pave over the grass
  - b) hold firework displays every night at 8 p.m.
  - c) let the grass around the pond grow taller
  - d) release wolves

Best practices for solving a wildlife problem, step-by-step

1. Assess the situation
2. **Choose management options**
  - Do nothing. Let the problem resolve itself.
  - Make the environment less attractive.
  - Scare the nuisance animal away.
  - Remove the culprit.
  - **Reduce the local breeding population.**
  - **Keep the animal out (exclusion).**
3. Do it (tools and techniques)
4. Prevent future problems
5. Evaluate success

10. In nearly every job, you'd expect to do this, or might advise your customers to take care of it. What is it?

- a) clean up the area with antibacterial soap
- b) tell the neighbors they'll be next. But if they hire you now, there's a 10% discount
- c) nothing
- d) exclusion, to prevent problems

11. Your customer tried a bird scare device, but it didn't work. He wants to know why. You explain (choose all possible reasons):

- \_\_\_ birds can't hear ultrasonic sounds
- \_\_\_ the birds get used to seeing it there, so it's not scary anymore
- \_\_\_ you played the alarm call of a crow, but those are starlings roosting in your tree.
- \_\_\_ your border collie is a wuss. When I drove up, the Canada geese were chasing your dog!
- \_\_\_ scare devices never work

12. Your customer wants to consider every option for solving his wildlife problem. You say:

- a) Well, there are several approaches. I could trap it, or try to scare it off, or put down some pesticides. That's about it. Trust me, let me trap the animal and take care of it for you. If we use pesticides, the squirrels could die in the walls, and that would stink so bad you'd be sorry you did it. You don't have to see a thing. But I don't have the time to talk all day.
- b) That's a trade secret. Don't you have to go to work, or something?
- c) It mostly comes down to capturing the animal. We can live trap the animal, or use a lethal trap. If I see the animal, I might be able to catch it using my

catchpole. I'd probably set this cage trap. Do you want to release the squirrels alive, or do you want me to take care of them? Because if you let them out, they might just get back in, so then it's important to fix all the holes to prevent that.

- d) Some wildlife problems stop after a short time, so you don't have to do anything. That's not true here. I suggest we use a combination of approaches. We make the place less cozy for the squirrels, while I work on removing them. You can try to scare them away. When we're done, we fix all the holes so they can't get back inside.

*Answers:*

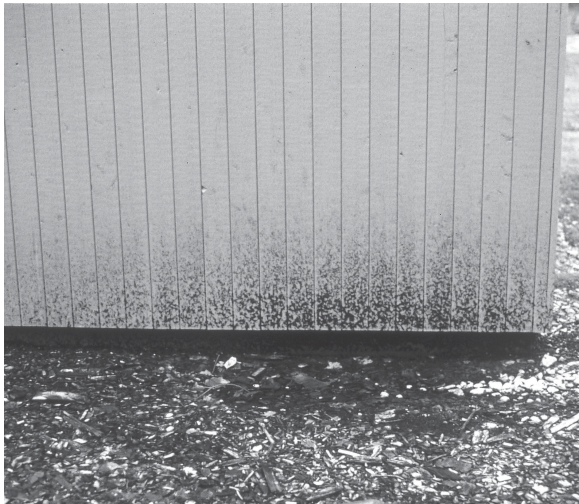
8: d

9: c

10: d (remember, most wildlife diseases that are common in the Northeast are not caused by bacteria, so an antibacterial soap isn't going to help that much. Choose a disinfectant, such as dilute bleach, instead.)

11: The only answer that's flat-out wrong is the one that suggests that scare devices and repellent techniques never work. It's unlikely that a border collie would be afraid of geese. This is one of the best breeds of dog to choose for hazing geese.

12: d



The smudge on this wall and the slight depression in the ground show where an animal has squeezed under the shed. It's important to locate the animal's travel routes and find the place where it enters the building. If you're going to remove the animal, those are among the best places to set a trap. In many cases, when you're done with the job, you'll block that entry hole to make sure animals can't get back into the building.



## STEP THREE: DO IT

### Learning objectives

- 5.12 Name five nonlethal and two lethal techniques for removing animals from an area.
- 5.13 Once you hit the road, you don't want to waste time driving back to the office. Describe five pieces of equipment you'd keep in your truck so you could respond to a wide variety of nuisance wildlife calls.
- 5.14 Which two animal removal techniques require additional training and other licenses or permits?
- 5.15 List six trapping tips that apply to the use of both live traps and kill traps.
- 5.16 You need to submit a raccoon for rabies testing. Which killing method can you use?
- 5.17 Describe how you'd clean an attic that had a family of raccoons living in it. What would you do if they'd been living in the chimney, instead?

With your overall problem-solving strategy in mind, now it's time to choose the techniques that will help you accomplish your goals. If you decided to do nothing, well then—you're done. If you'd like to make the environment less attractive to the nuisance animal, you'll find more suggestions listed in the species accounts in Appendices B and C. This manual won't go into any more detail about methods used to reduce local wildlife populations, but you can learn more about that from some of the resources listed in Appendix E. In this section, we'll explain some of the best practices for repelling, removing, excluding, and killing animals.

### Avoid creating wildlife orphans

Before you repel, remove, exclude, or kill an animal, take steps to prevent the orphaning of young wildlife. A lot of NWCO work happens when wildlife are raising their young, so this is an important consideration. Sounds pretty reasonable. How do you do it?

Unfortunately, this is another hotly debated topic that hasn't been well-studied. For raccoons and squirrels, there's some anecdotal information tracking the number of times a female will retrieve her young when certain removal techniques are used, but to our knowledge, no one has followed that all the way through to find out what happens later. How often does the female find a suitable den site in time? How easily does the family recover from the stress of the experience? Do a reasonable number of the young survive to adulthood?

### Best practices for solving a wildlife problem, step-by-step

1. Assess the situation
2. Choose management options
3. **DO IT (TOOLS AND TECHNIQUES)**
  - **Nonlethal techniques:**
    - direct capture
    - live traps
    - one-way doors
    - frightening techniques and repellents
  - **Lethal techniques:**
    - lethal traps
    - shooting
    - carbon dioxide chamber
    - cervical dislocation
    - stunning (primary method; in combination)
    - chest compression
    - barbiturates
    - pesticides
  - Clean-up and disposal
4. Prevent future problems
5. Evaluate success

Many people assume that den and nesting sites are plentiful and that females usually have several “up their sleeves.” Perhaps this is true for some species, in some areas. It's certainly not true in all places.

The best way to prevent orphaning is to convince your customers to wait until the young are mobile before removing, repelling, or excluding the family from the site. If that's unacceptable, you can try to capture and remove both the female and all of her young and hope that she will retrieve them and continue to care for them.

When is this most likely to work? Let's apply a little biological common sense. Older, more experienced females are probably better at finding resources than younger females. As the young age, they bond more closely with their mother, so she'd be less likely to abandon them. You can't change the ages of the animals you're dealing with, but if you think your chances of success are poor, you might choose a different option.

Some NWCOs are trying to refine removal techniques to increase the chances that the female will retrieve her young. Here are their suggestions.

- Time your activities to match the normal habits of that species. The sooner the female finds the young, the better. If they're left alone too long, they may die of exposure. For a nocturnal species, start at dusk.

- Remove the female, preferably using a direct capture technique such as a catchpole (described later).
- Place the female and young in a release box. (We'll describe several variations on this theme.) Many NWCOs use a simple cardboard box, others use a wooden nest box, such as a wood duck box, and some prefer plastic boxes.

Match the size of the box and its entrance hole to the size of the species, using a smaller box with a smaller hole for squirrels, and a larger box with at least a 7" hole for raccoons. (One NWCO recommends a 2x2x1 ft. box.)

Make sure the animal cannot immediately get out of the box by covering the hole. Then move them to a quiet place outdoors. Unless they're likely to be disturbed, keep the box at ground level. Remove the cover so the female can get out of the box. Another option is to build a box with a sliding door. Leave the door open about an inch, to keep the heat inside but make it easy for the female to slide it fully open so she can retrieve her young.

Some NWCOs prefer to use heated release boxes when it's cold outside. Make sure that the box doesn't get too hot. You may want to provide heat in just one area. Also, assume that if you put something in the box, they will chew on it. Don't give them access to anything that they shouldn't eat, such as wires. That means that if you choose to use a household heating pad as the heat source, make sure the animals can't reach the wires. To avoid that problem, one NWCO builds his boxes with a double floor, placing the heating pad in the space between the floors. Other options for heat sources include microwaveable heating pads and warm soapstones.

- If you can't catch the female, put the young in the release box and locate it as close to the entry site as possible.



Foxes often calm down once they're restrained with a catchpole. Since this healthy fox had accidentally wandered in, it was released on site.

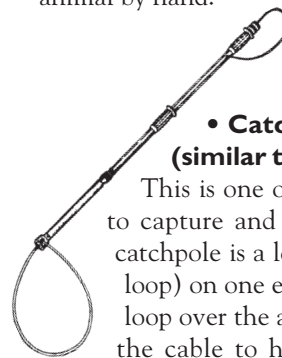
- Learn the typical birthing and rearing seasons of the species you handle. Know how to tell when a female is nursing and what young sound like.

How will you evict the animals? Here's an overview of the common techniques available to NWCOs.

## Nonlethal techniques

### DIRECT CAPTURE

Sometimes, you may be able to capture the animal immediately, using your hands or a simple device, such as a catchpole. If you can do so safely, this is often appealing to the customer. It may also eliminate the need for repeated visits to the site. Remember all of the safety tips from chapter four. The right gloves are especially important if you're going to try to catch an animal by hand.



Other useful devices include:

- **Catchpole, or "snare pole"**  
(similar to snake tongs, cat grasper).

This is one of the most versatile tools used to capture and restrain animals. Basically, a catchpole is a long stick with a noose (cabled loop) on one end. For most species, place the loop over the animal's head and then tighten the cable to hold the animal. Bobcats and

housecats can accidentally suffocate if the loop is only placed around their necks—it's better to place the loop over the cat's head and over one front leg. Minimize the amount of time an animal spends in this restraint.

Some catchpoles swivel, allowing the animal to twist without being suffocated. Commercial catchpoles often lock once you've pulled the cable tight, and also have a quick-release. (If you prefer to make your own, run a loop of plastic-coated cable through a piece of rigid aluminum pipe or conduit that's 3–4 feet long. You may still want to add a quick-release mechanism.)

Related hand-operated devices may substitute a vice-grip closure for the noose on the end of the catchpole. Imagine the kind of pincer that some people use to grab cans off a high cabinet. This can be useful if you're trying to capture a small animal, such as a squirrel, or if you can only reach a part of the animal and would not be able to get a loop around it. Poles with this

vise-grip closure usually don't have the restraining power of catchpoles.

Modified catchpoles are available for restraining snakes. They're often called snake "sticks," "tongs," or "hooks." These devices pin the snake's head to the ground. Use them carefully, because it's hard to tell how much pressure you're exerting so you could accidentally injure the snake's spine or even dislocate its head. Once the snake's head is restrained, grasp the snake just behind its jaws with your thumb and forefingers. This will give you control of its head. Support the snake's body (with your arm, a stick, or a pole) when you carry it. This will minimize its stress and prevent it from thrashing about.

What if you're confronted with a large nonvenomous snake, such as a boa constrictor, that's tightly wrapped around a person? If you can't work it loose with your hands, remember that snakes don't like cold temperatures. So have the person step into a cool shower. The snake will probably let go once the water hits it, and try to slither away.

Obviously, inexperienced people should not handle venomous snakes! NWCOs with the proper snake-handling training should still take a few precautions when working with venomous snakes.

Don't work alone. If you must, at least tell someone what you're doing. Call the local hospital before you go out on the job, to see if they have the proper anti-venin—and have them check that it's still good (they probably don't use it often, so it could be outdated). Bring along a garbage can with a lid, or a cage that you can put the snake in once you've captured it. One final tip: of the three species of venomous snakes native to New York, two are legally protected (timber rattlesnake, eastern massasauga) and may not be handled without special state permits.

• **A "catchpole combo."** Many NWCOs are talented tinkers. In this case, one person combined simple tools for a unique direct capture technique used to remove a raccoon from a fireplace chimney in one visit. This method requires a catchpole, a chimney brush attached to flexible fiberglass chimney rods, a ladder, and gloves.

Make sure the damper is securely closed. Climb onto the roof. Run the chimney brush (attached to flexible

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  - Lethal techniques:
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    - carbon dioxide chamber
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fiberglass chimney rods) down the chimney. When the brush enters the smoke chamber and drops to the damper, it opens up an escape route for the raccoon. As the coon climbs up into the flue, pull the brush up behind it to encourage the coon to move up the chimney. (The faster the brush is pulled up, the less likely the animal will try to force its way down past the brush.)

When the raccoon is four or five feet from the top of the chimney, use the catchpole to capture it and transfer it to a holding cage (usually a cage trap). Then, if there are young in the chimney, go inside the house. Open the damper and remove them with your gloved hands.

• **Buckets or small plastic containers.** This works well with bats and small snakes. Cover the animal with the container, and then slip a piece of stiff cardboard between the container and the wall or floor. You can then carry the animal outside and release it (remember: don't release bats if there was a possible rabies exposure).

• **Nets.** Two designs are the throw net and "hoop" net. Throw nets are tossed over the target animal. Hoop nets are attached to the end of a long handle. They're used to scoop up the animal. The net should be deep enough to allow the hoop to be twisted to

restrain the animal in the bottom of the net. A captured animal may climb out of a shallow net. The size of the mesh is important, too. If the mesh is too large, the animal may force its head through and injure itself or strangle. If you must use a shallow net, immediately place the frame against a flat surface to prevent escape. You can further restrict the animal's movement by carefully pressing on it with a stick. Whenever possible, encourage the animal to enter the net on its own. You might injure an animal while swinging a hoop net, if you accidentally hit it with the frame.

- Very few NWCOs have access to **drugs** (such as ketamine hydrochloride, tiletamine, alphachloralose, and metatomadine) that can be used to capture an animal directly. These “**immobilizing agents**” are heavily regulated by federal and state agencies. NWCOs with the proper training work under the supervision of veterinarians, who have the necessary permits from the U.S. Drug Enforcement Agency. In New York, permits are also required to use syringes and needles. Staff from USDA-APHIS-Wildlife Services may provide technical assistance for bird capture programs involving alphachloralose.

Although these drugs are not available to most NWCOs, they may increase the operator's safety while reducing the animal's stress. But things can go wrong, even for highly trained and experienced people, because when you're working in the field, you have less control of the situation.

For more information about alphachloralose, contact:  
Rich Chipman, State Director  
USDA-APHIS-Wildlife Services  
1930 Route 9, Castleton NY 12033-9653  
Phone: (518) 477-4837 • Fax: (518) 477-4899  
Email: Richard.B.Chipman@aphis.usda.gov



Live traps are effective devices for capturing many species. Shown here are a raccoon, opossum, and woodchuck in the back of a NWCO's truck. Notice the cardboard placed between the cage traps to keep the animals from seeing each other. This may reduce their stress during transport.

### General trapping tips

- The trap design should be matched to the species and to the situation.
- Always choose trap types that minimize the risk of catching unintended wildlife species or pets.
- Leave a phone number so your customer can reach you in an emergency.
- Set traps (including cage traps) so that children and domestic animals can't reach them. Either may harass captured animals and possibly get bitten.
- Be discreet; keep traps out-of-view of the general public.
- Secure and label all traps with your name and address (required by law).
- Take steps to protect captured animals from bad weather including summer heat, rain, snow, and cold. Covering a trap or setting it in a more protected location can help.
- For the most common nuisance species, you don't need to worry as much about getting human scent on the traps. Consider where they're living and what they do—they're used to people.
- The proper use of baits and lures may increase your capture rate and help you avoid capturing animals you didn't want to trap.
- To prevent trapped animals from reaching through the cage and tearing up turf or nearby objects, place the trap on pavement, or put a large piece of hardware cloth underneath the trap.
- Take steps to avoid orphaning wildlife.
- Set traps where they're most likely to capture the target animal and not others. (“Location, location, location.”)

### LIVE TRAPS

This is probably the animal removal tool used most often by NWCOs. A live trap is meant to capture an animal without killing it. Some types of live traps are cage traps (also known as “box traps”), multiple capture traps, foothold traps, nets, and a variety of bird traps.

Live trapping has some advantages. You can see what you've caught, and prove your success to your customer; and it prevents animals from dying in inaccessible locations, one of the hazards of using pesticides. In addition to the foul odor caused by decay, the presence



of a dead animal can attract other pests. In most cases, if you're using a live trap, you would be able to release an animal that had been caught accidentally.

There are some disadvantages to live trapping as well. It's usually labor-intensive, and you might capture the wrong animal. If the live trap is used improperly, an animal may die in it, from lack of food or water, exposure to heat during the summer, weather extremes, or from attacks by wildlife, pets, or people. Some animals might hurt themselves because of the stress of being restrained, or while trying to escape.

If you're not experienced with live traps, we strongly recommend that you seek hands-on training—especially before using foothold traps. There are several excellent courses, including the DEC Trapper Education Course, and the Trapper's College and Furbearer Management Short Course offered by Fur Takers of America ([www.furtakersofamerica.com/college.htm](http://www.furtakersofamerica.com/college.htm)). Sessions on trapping techniques are often incorporated into seminars, conferences, and conventions sponsored by NWCO associations and trapping associations (see the resource list for state and national contacts). There are opportunities for one-on-one instruction, too. Experienced trappers often advertise such services in trade journals. You'll also find many books, videos, and magazines about trapping. Consider reading *Trapping in the 21st Century*, which is available at [www.dec.state.ny.us/website/dfwmr/wildlife/wildgame/Trappers21.pdf](http://www.dec.state.ny.us/website/dfwmr/wildlife/wildgame/Trappers21.pdf).



cage trap in set position.

• **Cage traps** (a.k.a. “box traps”) are the main stock-in-trade of most NWCOs. These traps are often made of wire or plastic and come in many sizes and styles. They may open on one, or both ends. Customers may call all cage traps “Havaharts” after a popular model, but there are many designs and manufacturers, such as Tomahawk and Safeguard. For example, there are special, smaller versions of squirrel-sized cage traps that fit into woodstoves and chimney pipes.

An animal enters the cage, then steps on a treadle, which causes the door(s) at the end(s) of the trap to close. Cage traps are easy to set and do double duty as a carrier. Little site preparation is usually needed. They are generally safe for children and pets. Most people think they're humane. Unfortunately, most cage traps are bulky, and because of their size and shape, they're hard to conceal. This makes them more vulnerable to

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    - carbon dioxide chamber
    - cervical dislocation
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theft and vandalism. They are relatively expensive, and need frequent cleaning. Cage traps are not universally effective in capturing animals. Some species, such as foxes, are usually shy of these traps. Even individuals of species that are generally easy to catch in a cage trap, such as raccoons and gray squirrels, can be “trap-shy,” especially if they have been captured before.

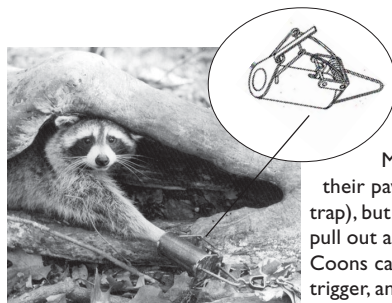
#### Tips for live trapping mammals in an attic using a cage trap

- Set the trap on the roof, as close to the entry hole as possible. Why not in the attic? Because adult raccoons seem to be less wary of traps on the roof than they are of traps placed in attics or on the ground.
- With a roof set, you can safely use a few baits that wouldn't be recommended for a ground set, such as pet food, because non-target animals aren't as likely to go up on a roof. Avoid oily fish products such as sardines, because they might stain the roof.
- With a roof set, you can also check the trap from the outside of the building.
- How will you keep the trap from sliding off the roof? If the owner agrees, drive screws part way into the roof, then wire the trap to the screws. Once the trap is secure, finish driving the screws into the roof, then dab some roof sealant onto the heads of the screws.

### Tips for live trapping mammals on the ground using a cage trap

- Set the trap in the animal's travel path, or in an area the animal uses often. (Look for sign.)
- Choose a bait that will appeal to the target animal but not attract unwanted animals. For example, pet food attracts raccoons—and cats and dogs. If you want to trap a raccoon, a better option might be marshmallows, which aren't as enticing to cats. Eggs are sometimes used as bait for skunks. Apples or raw vegetables are good woodchuck baits.
- Covering the bottom of the trap with soil or leaves may also convince an animal to enter.
- Raccoons may respond to a visual attractant such as a piece of aluminum foil suspended from the roof of the trap.
- There are many commercially available scent lures. Just be aware that lures may attract unwanted species, too. NWCOs tend to use lures when they're dealing with a trap-shy individual, or must set their trap away from the nuisance animal's favorite areas.
- After you have the trap set and baited, "dry fire" or trip the trap. Make sure the trap door(s) close smoothly and firmly.

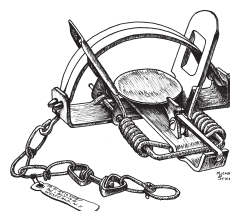
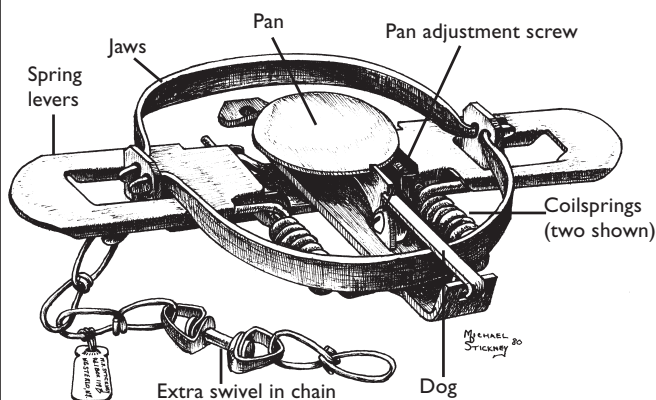
• **Multiple capture traps** can catch more than one animal without having to be reset. Most multiple capture traps are designed for mice. Some brands (such as Ketch-All®) will catch animals up to the size of chipmunks. However, larger animals are likely to suffer harm. Some designs (such as Ketch-All® and Kwick Katch®) have a wind-up spring that powers a rotating mechanism. The mice are shuttled into a holding compartment. Other traps (such as the Victor Tin Cat®) have one-way doors that allow mice to enter, but not leave. If you intend to use this as a live trap, you must ensure that it's checked often enough so that animals don't overheat and die in the trap.



This trap (Lil' Grizz Get'rz™) takes advantage of the coon's dexterity. Many animals can stick their paws into a "hole" (the trap), but most can't grasp and pull out an object that's within. Coons can. The object is the trigger, and they'll try to pull it out, which fires the trap.

• **Foothold traps** restrain animals by holding the foot. Foothold traps can be used on land and in the water. In nuisance wildlife control in New York, they are the most efficient tools for catching coyotes and foxes, and are also important for raccoon, beaver, and muskrat. There are several different designs, including the coilspring trap, which is probably the most commonly used foothold trap; the longspring trap; and several new designs (Lil' Grizz Get'rz®, Duffer trap®, EGG trap®) meant specifically for raccoons. These foot encapsulating traps reduce the chance of catching the wrong species and the risk of the raccoon injuring itself.

To set a coilspring trap, you must fully depress the spring levers. This compresses the springs. Then, place the dog across the nearest jaw until the tip of the dog fits into the notch of the pan. The dog holds the trap open in its set position. When an animal steps on the pan, it dislodges the dog from its notch and springs the trap, closing the jaws around its foot.



Above, a coilspring trap, a type of foothold trap, shown in its set position. This live trap is shown in its sprung position at left.

In some cases, modifying a standard coilspring trap by padding or laminating the jaws will reduce the chance of injuring the captured animal while possibly increasing the effectiveness of the trap. There are commercial models available with these modifications, too. Many NWCOs also add at least one swivel between the trap chain and the stake that anchors the trap to the ground. These swivels allow the captured

animal to move around without binding the chain and twisting its leg. (Most within the chain are double swivels, but single swivels are usually used at the end of the chain.)

Adjusting the pan tension on coiled spring traps helps reduce the chance of capturing the wrong species (an animal that weighs less than the target species should be able to step on the pan without triggering the trap). There are several ways to adjust pan tension. With some trap designs, you can tighten or loosen the pan tension screw, which controls the amount of pressure needed to spring the trap. The tighter the screw, the heavier the animal must be to spring the trap.

In New York, there are legal restrictions on the jaw spread of a foothold trap. The jaw spread is the distance between the two jaws when the trap is set (not counting the thickness of each jaw's gripping surface). A foothold trap set on land is allowed a maximum jaw spread of  $5 \frac{3}{4}$  inches; in water, the jaw spread cannot be greater than  $7 \frac{1}{4}$  inches. There's another restriction for foothold traps set on land in New York: if the trap has a jaw spread of 4 inches or larger it must be equipped with a pan tensioning device and must be covered with some material such as soil, sand, or leaves.

- **Nets** are usually used to capture birds, such as sparrows and starlings, inside warehouses. To use one type of fine-threaded net, called a "mist net," you'll need training, skill, and a permit (it takes skill to remove a bird from a mist net without harming the bird). Unless you have the appropriate federal and state permits, a NWCO should NEVER use a mist net to try to capture wild songbirds outside. Mist nets should be monitored during use and removed immediately after. Even veteran users can become frustrated trying to capture a sparrow or two in a net inside a large warehouse.

- **Bird live traps** are available in many designs. Most are designed to capture particular types of birds. Some will capture one bird at a time, while others can capture many birds. To increase your chance of success, give the birds time to get used to the cage trap. First, put out some bird seed, shelled corn for pigeons, or other appropriate bait to get the birds used to feeding in the area. (If the birds don't come to the site, choose another area.) Once the birds are feeding at the site, place the cage trap next to the bait and prop it open

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    - frightening techniques & repellents
  - **Lethal techniques:**
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    - shooting
    - carbon dioxide chamber
    - cervical dislocation
    - stunning (primary method; in combination)
    - chest compression
    - barbiturates
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with wires. Place bait outside and inside the trap, to encourage the birds to enter the trap. Finally, when the birds are used to entering the trap, set the trap and place the bait only inside the trap. Leave one or two captured birds inside the trap as decoys. Give them shelter, and water and food, daily.

- **Cable restraints.** This tool is not legal in New York, with one exception: with training, certification, and a special permit, a NWCO may use cable restraints to capture beaver.

### ONE-WAY DOORS ("CHECKVALVES")

These devices allow an animal to leave but not re-enter a building. They come in a variety of designs, sizes, and materials, from plastic checkvalves or nets used for bat control, to wire frames that are specially designed to fit certain cage traps. Some NWCOs build their own one-way doors. One of the advantages of using this tool is that you don't have to handle any animals. This is a relatively new tool in nuisance wildlife control, but its use is increasing.

Before installing a one-way door, conduct a thorough inspection to make sure there are no young present which are still immobile and dependent on their mother. One-way doors are only effective if the animal can find and use the exit but cannot find, or force its way back through the door—or find another way into the building. Remember, if a mother has been separated



One-way doors may look very different, but they all do the same thing: let the animal out and keep it from getting back in. Above, left: Looking into the device, you can see its trap door in the set position. At right, the same one-way door design, used to remove flying squirrels from an attic. If you opened the left-hand side of the device, they'd leave on their own. Bottom: Mesh is often used to make a one-way door for bats. This one-way door design is usually called a "checkvalve."

from her young and they're still inside, she will be highly motivated to find another way in.

Here's how a one-way door is used in bat control. A commercial checkvalve or simple netting is installed over the bat's primary exit hole. All the other holes are sealed. Bats exit at the bottom of the one-way door, but when they attempt to return, their sense of smell guides them back to the hole. They land on the mesh (or checkvalve) near the hole, and stay there, sniffing around. They just don't crawl down the mesh. After a suitable period of time, the one-way doors are removed, and the main entry sites are closed. (For more information, see the "house bats" account in Appendix B or the Cornell Cooperative Extension's video, *The facts about bats: Exploring conflicts, designing solutions.*)

## FRIGHTENING TECHNIQUES AND REPELLENTS

Repellents, you may remember from the earlier discussion, are objects, substances, or techniques that frighten an animal away. Or they make the desired object, such as a crop or nesting site, undesirable—the repellent may make that object smell or taste nasty, or feel bad to the touch.

There are several tools and techniques used to repel animals: scare devices; chemicals (which can only be used by NWCOS with a commercial pesticide applicator license); hazing with dogs, hawks, falcons,

or radio-controlled boats and cars; and the use of guard animals.

- *Objects that look scary*, such as mylar tape, strobe lights, lasers, models of predators, and "scare-eye" balloons, are often used to drive off birds. Geese and crows can be easily dispersed from a night-time roost by pointing a spotlight, laser pointer, or laser pistol (such as the Avian Dissauder®) at them. Visual repellents range dramatically in price, sophistication, and effectiveness. For example, everyone recognizes a scarecrow, but there are versions that actually move. These animated "human effigies" tend to work much better than the charming homemade kind, which are better considered as garden decorations. (Whenever possible, choose a repellent that moves, such as by swaying in the wind). Visual repellents should be clearly visible.

- *Objects that sound frightening*, include a variety of firecracker-like noisemakers and recordings of distress calls and alarm calls. Sometimes, even banging a pot or rattling tin plates will drive off birds (but not ultrasonic devices, which they can't hear). Distress and alarm calls are most effective. Before using any noisemakers, check local ordinances and consider the effects on the neighbors. Fireworks-based noisemakers (a.k.a. "pyrotechnic devices") include

**bangers** (a.k.a. "bird bombs"): makes a loud bang. It's often launched from a handheld pistol launcher. Bangers can be used at medium range (50–100 feet).

**screamers**: makes a long, drawn out whistle. They can be launched from a handheld pistol launcher or a 12-gauge shotgun. The shell flies out about 100 feet, screaming and whistling all the way.

**shell-crackers** (or "crackers"): makes a loud bang that sounds like a M-80 firecracker. These shells are fired from a twelve-gauge shotgun, exploding about 75 yards away.

**propane cannons**: unlike the other devices, propane cannons can be used with a timer. All of the other devices must be fired by a person.

There are a few devices that combine flashing lights and scary noises, for example, the Critter Gitter®. Some of these can be very effective because they vary the pattern of the frightening element.



- *Chemicals that make objects smell, taste, or feel bad.* You'd need a commercial pesticide applicator license to use any of these products in your NWCO business. For information about the training, contact the DEC's Bureau of Pesticide Management or Cornell's Pesticide Management Education Program.

- *Hazing* describes a technique in which dogs, hawks, falcons, or radio-controlled aircraft and boats drive nuisance animals away from a site. Hazing Canada geese with border collies is one of the most effective ways to chase the birds away from golf courses, public parks, and similar locations. Hawks are sometimes used to chase other birds away from airport runways.

Don't haze birds in their nesting areas during the nesting season—that's a violation of the Migratory Bird Treaty Act. Be very careful if you want to haze Canada geese during their molt (usually June 15–July 15), because the geese are vulnerable and can't fly. It's wise to first secure a permit that would allow the taking of geese. Even a well-trained dog might accidentally injure a goose while chasing it. Without a permit, that's also a violation of the Migratory Bird Treaty Act.

- *Guard animals* such as dogs and llamas are sometimes used to protect livestock, especially sheep, from predators. The livestock and the guard animal must be kept within a fenced area. Dogs can sometimes protect orchards or Christmas tree plantations or vineyards from deer or turkey damage.

You may encounter different definitions of "repellent" and "exclusion device." There is natural overlap between the two categories. Don't sweat it. We've classified products that are meant to be permanent installations, such as porcupine wire and post-and-grid systems, as exclusion devices. Although they repel birds, these devices are clearly barriers. Recordings of distress and alarm calls may have a long-lasting effect, but they are noisemakers.

Does this classification matter to anyone but an academic? Yes—because you need to remember that in general, repellents are a bit trickier to use. Although they may provide quick relief, it often doesn't last. Exclusion devices, on the other hand, often require an up-front investment because the materials and installation may be expensive. They tend to provide long-lasting results, and help to prevent problems. Exclusion can be a proactive approach, but repellents are generally a reactive strategy.

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    - live traps
    - **one-way doors**
    - **frightening techniques & repellents**
  - Lethal techniques:
    - lethal traps
    - shooting
    - carbon dioxide chamber
    - cervical dislocation
    - stunning (primary method; in combination)
    - chest compression
    - barbiturates
    - pesticides
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### General tips for the use of repellents and frightening techniques

- Before you use any repellents, double-check their legal status at all levels: federal, state, and local. Are you dealing with a protected species (usually, a migratory bird)? Any local ordinances that come into play? For example, noise ordinances would affect your ability to make use of pyrotechnic devices, which are purposefully loud. Local bird control ordinances might affect your choices, too.
- If you want to use chemical repellents, you must follow pesticide regulations.
- Often, a combination of techniques is more effective than using one technique by itself.
- Repellents tend to be more successful in preventing new behavior (such as roosting, nesting, or feeding) than in stopping a well-established behavior.
- Another thing to remember is that animals get used to both visual and sound repellents. To increase your chance of success, mix things up a little. Move the devices around. Change the patterns of the noise or lights. Keep it unpredictable.
- Remove the devices after the problem has stopped (or if the animals have left the area for other reasons).

## Lethal techniques

Just as there is no magic pill solution to wildlife conflicts, there is no one killing technique that will work best for all species or in all situations. Some methods are not appropriate for young animals or diving or burrowing animals. Some work better with birds, or reptiles, or mammals. Some require additional permits, or more than an average level of skill, experience, or strength. They may be effective for some NWCOs and not others. And if rabies is an issue, you must select your method carefully.

Sometimes, protecting people will be your highest priority. You may need to kill an animal as quickly as possible. Even in such cases, do the best you can to provide the most humane death possible under the circumstances. Most people agree that a “humane death” is one that is as painless as possible. The ideal is to be quick. Either kill the animal quickly, or cause rapid unconsciousness, then rapid death.

You need to know just a little bit about how animals experience pain to understand how this works. A sensation triggers an impulse that travels along the nerve endings to the brain. The brain interprets this as—ouch!—pain. (The most important part of the brain involved in the sensation of pain is the cerebral cortex, which is in the front of the brain. Other parts of the brain are involved in the feelings of fear, anxiety, and discomfort.)

The brain must be working in order for the animal to experience pain. If you can break the circuit between the brain and the rest of the body, the message will not be delivered and understood; the animal will not feel pain.

*Bottom line: no working brain, no pain.*

That seems straightforward so far, doesn't it? Unfortunately, there is disagreement about which methods are appropriate to kill wildlife under field conditions. There hasn't been much research that's really relevant to the situations NWCOs encounter. And to make things even more difficult, some of the methods that are well-accepted for wildlife, such as shooting, cannot be used in all areas.

The following recommendations are meant for the species discussed in this manual. In the species

accounts in Appendices B and C, we've listed preferred and acceptable killing methods for each species. Whenever possible, use a preferred method.

Some of the lethal techniques we'll describe can also be used as removal methods, such as lethal trapping, shooting, and the use of barbiturates or pesticides. The others are strictly killing methods: the use of a carbon dioxide chamber, cervical dislocation, stunning, and chest compression.

This list reflects current scientific information and the judgement of experienced NWCOs and wildlife biologists—people who care deeply about the treatment of wildlife and have actually used these methods in the field over many years. Many factors were considered when evaluating a method. Is it as quick and painless as possible? Is the technique or product generally safe for the NWCO, the public, other animals, and the environment? Is it practical for use in the field? Does it require additional permits? Is it legal in most places? How reliable is the method? Can most NWCOs be expected to master the technique, or does it require more than average skill or strength? Although we did consider public opinion, we did not rule out techniques that don't look pretty because in some situations, these methods may provide a more humane death than a technique that looks better.

Some of these methods also meet the guidelines described in the *2000 Report of the American Veterinarian Medical Association Panel on Euthanasia*. (Although their report focuses on domestic animals and the techniques used to kill them in a controlled, indoor setting—it was written for vets, after all—you may still wish to read it to better understand some of these techniques. The report is available at [www.avma.org/resources/euthanasia.pdf](http://www.avma.org/resources/euthanasia.pdf).)

This is the aspect of your job that might require the most discretion. In general, it's best to work in private. If a crowd has gathered, ask them to leave, or move the animal to a private setting before you kill it. This is safer for the people and kinder to the animal, who may be stressed by the presence of the crowd. If you must kill an animal in front of others, first explain what you are doing and why.

Carry a variety of tools so you can choose from the full range of methods, selecting the one that's most appropriate for the situation. In some cases, you may

use one method to cause unconsciousness and another to kill the animal.

With the exception of lethal traps and the use of pesticides, which are set and then left in place, the NWCO is able to monitor the animal to make sure it experiences as little distress as possible. Some lethal methods, such as the use of carbon dioxide chambers, may require adjustment during the process. It's also important to confirm that the animal's dead. An easy way to do this is to touch the animal's eye with a long stick. If it's dead, it won't blink.

#### General tips for the use of lethal traps

- The trap's size and design should be matched to the species and to the situation.
- Use the smallest trap appropriate for the targeted species.
- Leave a phone number so your customer can reach you in an emergency.
- Set traps so that children and domestic animals can't reach them and get hurt.
- Be discreet. Keep traps out of view of the general public. If you can't switch to a less visible place, then hide the trap with a cardboard cover. There are commercial models that are enclosed within a tunnel, which partially conceal the trapped animal (designed for squirrels).
- Label all traps with your name and address (required by law).
- Secure traps so predators can't remove them.
- At least one of the trap's jaws must be able to rotate fully.
- Take steps to avoid orphaning wildlife.
- Always choose trap designs and methods that minimize the risk of catching unintended wildlife or pets. This might include using baits to selectively attract the target; placing the trap in a vertical "cubby" set, deep-notch box, or in a bucket with a restricted opening, so other animals can't reach the trap; covering the burrow entrance and trap or using a one-way trigger, so the nuisance animal encounters the trap when it tries to exit through its hole, but other animals can't reach the trap; and adjusting the trigger position to match the size and habits of the target species.
- The proper use of baits and lures may increase your capture rate and help you avoid capturing animals you didn't want to trap. Baits and lures are more often used with snap-back traps.

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    - one-way doors
    - frightening techniques and repellents
  - **Lethal techniques:**
    - **lethal traps**
    - shooting
    - carbon dioxide chamber
    - cervical dislocation
    - stunning (primary method; in combination)
    - chest compression
    - barbiturates
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#### LETHAL TRAPPING

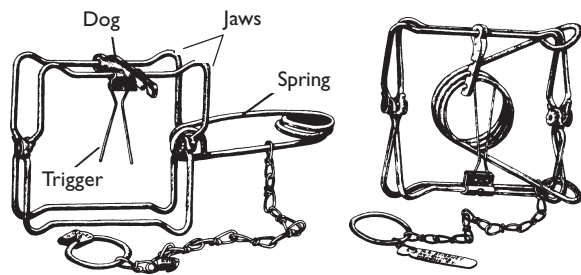
The types of lethal traps most frequently used by NWCOs are mouse and rat snap-back traps, body-gripping traps (such as the Conibear® line), and mole traps. Most lethal traps kill an animal with a mechanical blow. When properly set, lethal traps are usually highly effective and selective. Although death usually comes quickly, it's not always instantaneous. Lethal traps may work faster than cage traps, reducing the number of visits needed.

Lethal traps are appropriate for use with small to large mammals (mice to beaver size) and unprotected birds of any age. Match the size of the trap to the size of the targeted animal, but use the smallest trap appropriate for the target. The lethal traps currently available in New York are generally not suitable for use with deer, bear, coyotes, foxes, and some birds.

There are some disadvantages associated with the use of lethal traps. First, they're lethal. If you've caught the wrong animal you can't release it unharmed. If a trap is not set properly you may get a bad or nonfatal capture. It takes more skill, experience, and time to set a lethal trap (you might need more strength or setting tools). The site often needs to be prepared.

Again, if you are not an experienced trapper, we strongly recommend that you seek hands-on training—especially before using body-gripping traps. There are several excellent courses, including the DEC Trapper

Education Course, and the Trapper's College and Furbearer Management Short Course offered by Fur Takers of America ([www.furtakersofamerica.com/college.htm](http://www.furtakersofamerica.com/college.htm)). Sessions on trapping techniques are often incorporated into seminars, conferences, and conventions sponsored by NWCO associations and trapping associations (see the resource list for state and national contacts). There are opportunities for one-on-one instruction, too. Experienced trappers often advertise such services in trade journals. You'll also find many books, videos, and magazines about trapping. Consider reading *Trapping in the 21st Century*, which is available at [www.dec.state.ny.us/website/dfwmr/wildlife/wildgame/Trappers21.pdf](http://www.dec.state.ny.us/website/dfwmr/wildlife/wildgame/Trappers21.pdf).



Left, body-gripping trap in set position. At right, a sprung trap.

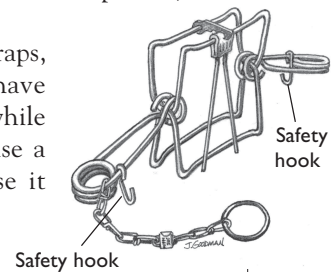
• **Body-gripping traps** are spring-loaded lethal traps available in many sizes. They're usually square, but some specialized models are round. Body-gripping traps are often called "Conibears," which is the name of a popular model manufactured by Oneida-Victor, Inc., but there are many manufacturers. There are also new, smaller designs, including some with one-way triggers, which are more selective, and traps designed specifically for squirrels.

"Magnum" or "zero tolerance" versions are also available. This model is stronger and its jaws close very tightly, so it often kills faster and more consistently than the standard trap. This may increase the chance of a proper strike with squirrels or raccoons, or other small or flexible animals that might pull back if there's a slight gap between the jaws. Magnum versions are very strong—a #220 Magnum body-gripping trap could break bones—so be very careful when setting the trap. Consider using setting tools and safety devices.

To set a body-gripping trap, you must compress the spring until its tips nearly meet at the rotating point. This tool often provides the quickest way to remove a raccoon or squirrel from an attic. Another advantage

of the jaws. Then hold both jaws open and fit the dog (a.k.a. the "trigger hook"), which is notched, into the notch located on the trigger. Once securely in place, the dog holds the jaws open. In its correct position, the jaws of the trap close on the top and bottom of the animal. Stabilize the trap to keep it in this top-to-bottom strike position, and to ensure that it can't easily be knocked over. Anchor the trap, too. (These traps are lightweight enough to be carried off by predators attracted by the captured animal.) In New York, the jaw spread of a body-gripping trap set on land cannot be greater than  $5\frac{3}{4}$  inches (the jaw spread is the distance between the two jaws when the trap is set).

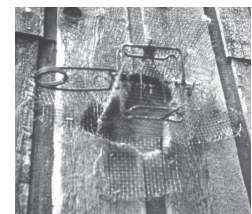
Some models of body-gripping traps, usually those with two springs, have safety hooks that hold one spring while you're setting the other. If you use a safety hook, remember to release it when you're done setting the trap, so the trap can fire.



When an animal passes through the jaws of the trap, it moves the trigger, which dislodges the dog from its notch and springs the trap, closing the jaws around the animal's neck or chest. Ideally, this trap catches the animal directly behind the head, snapping the part of the spine that's in the upper third of the neck (called the "cervical spine" area). A proper hit provides a quick death.

If you are trapping raccoons, skunks, squirrels, or woodchucks, modify the trigger to help to ensure a top-to-bottom strike (which is more humane) and prevent the animal from refusing to enter the trap. These species don't like to have anything brush against their eyes or whiskers, so separate the trigger and center it on the bottom of the trap.

As with all lethal techniques, care is needed to make sure that only the intended nuisance animals are caught. Body-gripping traps are often set in front of the animal's entrance hole because the animal must pass through the jaws of the trap to be captured. This way, only an animal entering or leaving the hole will be caught. If necessary, guide the animal into the trap. Use hardware cloth to reduce the size of the entry hole (shown in the photo) or to block escape routes.





This tool often provides the quickest way to remove a raccoon or squirrel from an attic. Another advantage is that non-target animals are not nearly as likely to be on the roof as they are on the ground. But this trap is not appropriate for all settings.

Use extra caution if you're setting a body-gripping trap on the ground, because of the risk to people, pets, and other wildlife. You can modify your technique and your equipment to minimize these risks. Here are some suggestions.

#### *Cover the trap and burrow entrance*

Let's say you've been unsuccessful trying to catch a woodchuck in a cage trap, or you need to trap many woodchucks. A body-gripping trap, if used cautiously, may be the right tool. Dig out the opening to the woodchuck's den a bit, so you can set the body-gripping trap in the burrow's entrance. The trap should be



Three views of a body-gripping trap placed in a vertical cubby set. Above left: The vertical cubby is attached to the tree at about five inches off the ground, to make sure that a dog can't reach up into the box and spring the trap. Right: In this set, the trap was held in place by friction, so when it sprung, the trap fell out of the box. You can anchor the trap so it will remain in the cubby after it's sprung, too. Bottom: Bait is placed on a shelf near the top of the box. Notice the body-gripping trap in its set position. You can see the trigger and jaws within the box, and the spring sticking out to the left.

#### Best practices for solving a wildlife problem, step-by-step

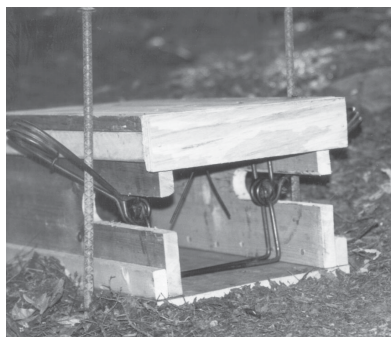
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      - barbiturates
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attached to a stake in the ground. Cover the burrow entrance and the trap with a large, loosely attached piece of hardware cloth, or with a box. When the woodchuck leaves its den, it will spring the trap, but an animal poking its head into the burrow entrance wouldn't.

#### *Place the trap in a container (a vertical cubby set, deep-notch box, or bucket with small hole)*

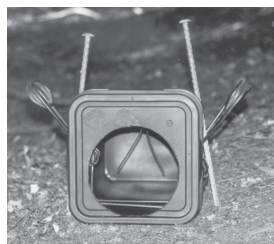
One way to lower the risk of catching an unintended species is to use a vertical "cubby" set, shown in the photographs. This is a baited box that's open on one end, with the trap set well inside, usually held in place by friction between the coilsprings and the narrow notch in the box. You must use a model with two coilsprings, because one with a single spring won't stay in place. Make sure the open bottom of the box is no more than five inches off the ground. If a dog investigates, it may be hit on the nose, but it's unlikely that the trap would capture the dog. Cats cannot easily enter a vertical cubby set.

The deep-notch box is an alternative to the vertical cubby set. It's set horizontally on the ground. If you're using a #220 body-gripping trap, the notches should be 8" deep. The trap is placed in the midpoint of the notches, which hold the trap in place. Make sure the trap is securely anchored. Center the trigger on the top of the trap. Bait should be placed deep inside the box, at least 6" behind the trap. The top of the deep-notch box is blocked with a piece of wood (see photo).



By restricting the size of the opening, you reduce the risk that a dog will spring the trap. The opening of a deep-notch box should be no more than 7" high.

Although the vertical cubby set and the deep-notch box work on the same idea, and are interchangeable, they have different strengths. The vertical cubby is less likely to attract cats (unless you've used the wrong bait) and is even more dog-proof than the deep-notch box. Sometimes, a raccoon will avoid a vertical cubby but investigate a deep-notch box. Some NWCOS prefer one design over the other, as well.



Another option is to place the body-gripping trap inside a plastic bucket that has a restricted opening. The bucket can be round or square, as long as it has a lid. An opening no larger than 7" is cut into the lid, slightly off-center. It works like a deep-notch box, only it's made from plastic instead of wood. Have some extra lids prepared, in case one is damaged or lost.



#### *Use baits that selectively attract the nuisance animal*

Both marshmallows and sardines will attract raccoons, but marshmallows won't entice cats, so that's a safer bait to choose if you must trap in an area where there are free-roaming cats. Mice will be attracted by many baits that are of varying appeal to other species, but you could avoid using bait entirely. Tie a cotton ball to the trigger instead. That's an attractive bit of nest material to a mouse, but cotton is of no interest to many other species. Whenever possible, use baits and lures that will attract only the nuisance animals.

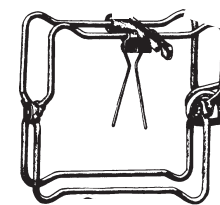
#### *Use a trap with a one-way trigger*

The one-way trigger rests against the bottom jaws of the trap and only moves freely in one direction. In

this illustration, the animal would have to move from left to right to lift the trigger and spring the trap. An animal coming from the other direction might bump the trigger, but it's not likely to lift it high enough to spring the trap.



Compare the trap with the one-way trigger to the standard model shown below it. See how that trigger swings freely? It can spring the trap regardless of which way the animal approaches. That means it can catch an animal on its way out of its den, which is what you want—but it might also accidentally capture an animal that stopped to investigate. In some cases, that might be the wrong animal.

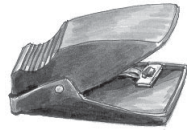
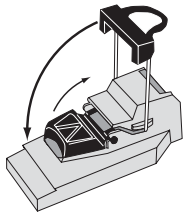


There are commercial traps with one-way triggers, but you can modify an existing trap, too. For example, you can add a 220-wire trigger to a #120 body-gripping trap.

- **Mouse and rat snap-back traps.** The familiar mouse trap is a form of body-gripping trap. And yes, people have "built a better mouse trap." Several, in fact (see the illustrations on the next page).

Your trapping strategy will vary depending on whether you're trapping mice, rats, or other small mammals. See the species accounts for mice and Norway rats in Appendix B for information about the number of traps to use and how to place them effectively.

If you're trapping mice or rats, you'll need to use many traps, so you may want a model that's easy to set. There are many options besides the traditional mouse trap, which can be cumbersome. Snap-back traps with expanded triggers, and the "clothespin" design are much easier to set than the traditional mouse trap. The Quick Kill Mouse Trap made by Victor has a lid over the bait cup. Only animals that are motivated to seek the bait will lift that lid—and that's what triggers the trap. This means that an animal can accidentally step on the lid without setting off the trap. There's another advantage to this design. The bait cup is located to position the mouse in the perfect strike position. So this trap is both more selective and more effective than the traditional mouse trap. It also has a safety catch and will not fire if it's picked up.



Left: Victor Quick Kill Mouse Trap. The bait cover, which is actually the trap's trigger, is shown in black (with the "V"). When the lid is lifted, the strike bar lowers. Right: a clothespin design.

- **Mole traps**, another form of body-gripping trap, come in several designs. Some spear the moles with a harpoon, others have scissor-like jaws. They are all set underground in the moles' tunnels. The key to successful mole trapping is to identify active tunnels. Look for dead grass or soft spots in the lawn. Prepare the site and set the trap according to the instructions given for the particular trap design. If there is no activity after a few days, move the trap. If moles are active near the trap, but you're not catching them, either add more traps, or switch to another type of trap.

- **Foothold traps** can be used as lethal traps, as well. This is generally limited to a submersion set used to capture beaver or muskrat.

- **Glue boards** are just what they sound like: a layer of long-lasting adhesive spread over a surface, usually cardboard or plastic. Small animals get stuck in the adhesive. Although some call the glue board a live trap, it's not often used that way. In fact, some biologists believe that you cannot remove the animal from the trap unharmed, because the oil that is used to loosen the glue may harm the animal. In practice, animals are frequently left to die on glue boards. Glue boards are not recommended as a general-use tool. They may be needed to deal with some severe infestations of mice or rats. Snap-back traps are often as effective as glue boards and are more humane, though setting them does take more effort. If you use glue boards, check them frequently and use a best practice to humanely kill the mice or rats.

Advantages of lethal trapping:

- when it works right, lethal traps are one of the fastest and most humane killing methods
- same piece of equipment can be used to capture and kill animal, so there's less handling involved
- equipment is easy to get and reasonably priced

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    - one-way doors
    - frightening techniques and repellents
  - **Lethal techniques:**
    - **lethal traps**
    - **shooting**
    - carbon dioxide chamber
    - cervical dislocation
    - stunning (primary method; in combination)
    - chest compression
    - barbiturates
    - pesticides
  - Clean-up and disposal
4. Prevent future problems
5. Evaluate success

- it's easy to transport equipment
- equipment is lightweight and compact, especially when compared to cage traps

Disadvantages:

- can capture and kill nontarget animals
- can hurt people
- may require additional tools to set the trap
- misfire could result in injury to animal
- site often needs preparation, so it may take longer to set trap

## SHOOTING

Firearms includes pistols, shotguns, rifles, hand guns, and air rifles (high-end pellet guns). This technique is appropriate for use with medium to large mammals (squirrel size and larger), birds, and reptiles. Obviously, shooting requires training and skill. There are safety concerns and legal restrictions to consider, too. For proper training in the use of firearms, attend the DEC Hunter Education course or a training course sponsored by the National Rifle Association (NRA).

If an animal is restrained, shooting may be one of the fastest and most practical ways to humanely kill a wild animal.



#### General tips for the use of shooting:

- Take the time you need to take the best shot.
- The type of firearm you choose and the ammunition should be matched to the size and species of the animal.
- In most cases, small-caliber, low-energy projectiles are best. A .22 caliber rifle is adequate for most small mammals. Air rifles may be used on squirrels and birds. Among the most effective types of ammunition are hollow point bullets or low velocity .22 rimfire cartridges, such as shorts or CB caps, which are also quieter.
- Pay attention to the surface underneath, around, and behind the animal. Could a bullet ricochet? Bullets are less likely to ricochet off softer surfaces such as dirt or grass than off hard surfaces like concrete, asphalt, or rocks, or water.
- You must follow both state and local firearms regulations.
- Make sure the situation is safe. If a crowd has gathered, disperse them before you shoot the animal, or take the animal elsewhere.
- Some species continue to move after they've been shot, such as squirrels, birds, raccoons, opossums, and woodchucks. This is a reflex but can be difficult to explain to someone who's watching. A good reason to be discreet.

#### Guidelines for shooting mammals:

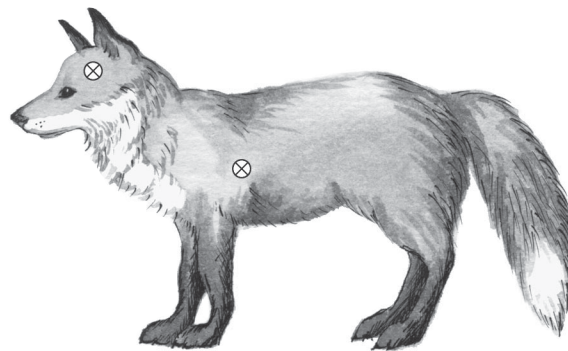
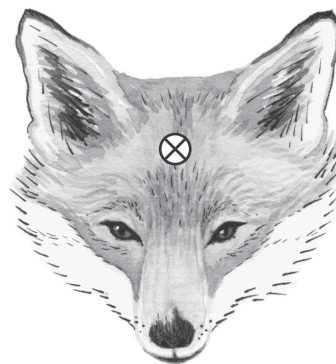
If you need to do a rabies test, don't shoot the animal in the head. You might destroy so much brain tissue that the lab wouldn't be able to do the test, and you could spray potentially contaminated brain tissue into the air, which might expose you to the virus if the tissue came into contact with your eyes, mouth, or nose. (Rabies virus by itself is not airborne.) Instead, aim for the heart and lungs. The heart/lung target may also be a better option if dealing with a free-roaming animal, such as a deer.

What if you shot an animal in the head, and later learned that a rabies test is needed? Don't panic. Submit the specimen. In many cases, the specimen will be adequate. What about that worst-case scenario, when it's not possible to do an accurate rabies test? Then, as a precaution, the exposed person or animal would receive the post-exposure rabies vaccinations.

That's not fun, and there's a limited supply of one of the products that's given as part of this series, so don't be cavalier about the quality of the specimens you submit for rabies tests.

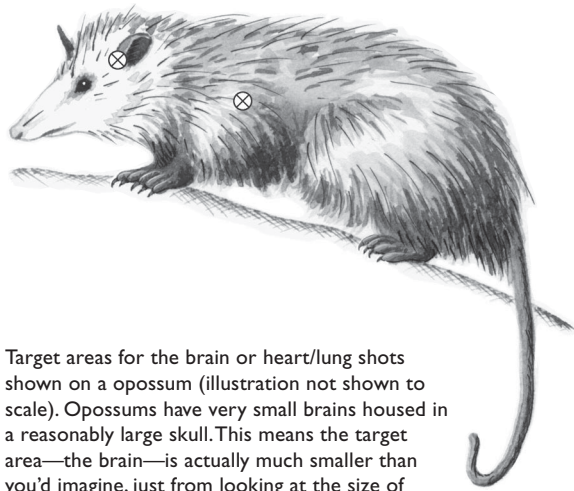
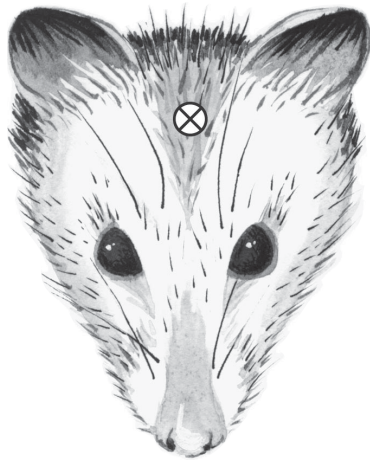
Although the head shot (aiming for the brain) is often considered faster and more humane than the heart/lung shot, this isn't necessarily true. Please note that few people would be able to ensure a proper head shot at anything except close range.

To properly target either the brain or the heart/lungs, you must think in three dimensions. Without proper aim, the bullet could deflect off the skull. For the brain shot, the barrel of the firearm should be a few inches from the head. Ideally, aim so the bullet will travel through the brain and spine and lodge in the animal's body. If the animal's head is turned so you don't have the right target, you may be able to distract it and get it to move its head by tossing a rock.



Target areas for the brain or heart/lung shots shown on a fox (illustration not shown to scale). These target areas are the same for most mammals, with the exception of the opossum.





Target areas for the brain or heart/lung shots shown on a opossum (illustration not shown to scale). Opossums have very small brains housed in a reasonably large skull. This means the target area—the brain—is actually much smaller than you'd imagine, just from looking at the size of the animal's head. Their brain is about the size of a pea.

Opossums also have a very big crest that runs down the center of their skulls, called the "sagittal crest." It's strong enough to deflect bullets. Unfortunately, if you try to aim slightly off to the left or right to avoid hitting the crest, you could miss the brain entirely. A side target might be a little easier. Imagine a line drawn between the eye and the ear, and aim closer to the base of the ear.

Guidelines for shooting birds (unprotected species): House sparrows, starlings, and pigeons can become trapped within large buildings such as malls, warehouses, and airport terminals. These structures often have food, water, and even nesting resources that allow the birds to survive. One of the most effective ways to remove a small number of birds from a large building is with an air rifle. Choose a higher end model

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    - **shooting**
      - carbon dioxide chamber
      - cervical dislocation
      - stunning (primary method; in combination)
      - chest compression
      - barbiturates
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with a scope for improved accuracy and performance. Most often, you'll shoot the birds when the building is closed to the public. (Although pellet guns are not as powerful as gunpowder firearms, there are still risks to human safety, and to property.) Learn where the birds roost, then choose a position that will provide you with good shots. The building management may have a lift that will provide you with an elevated platform.

Advantages of shooting:

- shooting is one of the fastest and most humane methods for killing wildlife
- it will work with many different species, under many conditions
- minimizes the handling of a live animal

Disadvantages:

- may splatter brain tissue, saliva, or blood, which could expose someone to wildlife diseases
- may interfere with the collection of the tissue sample needed for the rabies test
- cannot be done everywhere. There are legal restrictions and safety concerns that limit its use
- requires skill and proper equipment
- can be dangerous to people and other species

## CARBON DIOXIDE CHAMBER

The technique is fairly simple: the animal is placed in an enclosed space into which carbon dioxide gas is added at a controlled rate. When the animal breathes this gas, it quickly loses consciousness and then dies. The entire process takes about five minutes.

### *How does it work?*

Carbon dioxide (CO<sub>2</sub>) is a colorless, odorless gas. It's called an "inhalant agent" because the animal must breathe it in. CO<sub>2</sub> affects the nervous system, the lungs, and the heart.

### *Can I use CO<sub>2</sub> on any species?*

Carbon dioxide chambers work well to humanely kill birds, rodents, and most small mammals. But you may encounter problems if you try this technique on animals that are old, very young (less than 2 weeks old), weak, or sick with a respiratory disease, because they're often resistant to the effects of carbon dioxide. If possible, choose another technique to humanely kill animals that breathe slowly (such as reptiles or amphibians) or are very good at holding their breath (such as beaver and diving birds). Under these circumstances, CO<sub>2</sub> might take too long to be considered a best practice.

Commercial carbon dioxide chambers are often made of metal and have windows for monitoring the animal, but the chamber can be made of many materials, such as plywood or plastic. Coolers, garbage cans, and other containers have been converted into chambers. The best chambers are clear or have windows so you can monitor the animal, and are also easy to clean and transport.

You may want to have several chambers of different sizes and designs, and a portable model. For example, bats can be more humanely killed in a small chamber that fills faster. A small, clear plastic container with two holes drilled into it (one for the tube feeding the gas, and a vent hole) would work well.

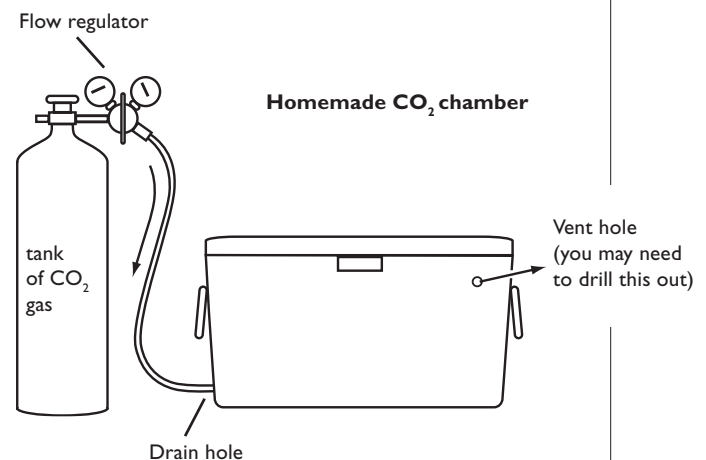
One NWCO has rigged a garbage container on wheels to serve as both an enclosed trap and carbon dioxide chamber. He sets a cage trap within the chamber, then, after capturing the animal, wheels the can to a place where he can safely and discreetly attach the carbon dioxide tank and kill the animal. This combination of a trap within the CO<sub>2</sub> chamber also offers a safety advantage, because there is no handling of the animal.

Consider such an approach, especially when dealing with sick, rabies suspect, or highly aggressive animals.

There may be a market niche for those willing to provide on-site wildlife euthanasia services, especially in areas where other techniques that are generally accepted by the public, such as shooting, aren't legal or practical. With care, carbon dioxide chambers can be safely transported.

### *Equipment needed*

- chamber that's twice as big as the animal
- tank of carbon dioxide gas (available in several sizes such as 6 lb., 20 lb., 50 lb., and 60 lb. If you don't need to lug it around, a larger tank might be cheaper to refill.)
- hose or rubber tubing
- flow regulator
- commercial carbon dioxide chambers are available in different designs
- check with welding suppliers; you may be able to rent some of this equipment



Many commercial coolers come with a drain hole at the bottom. Attach the hose to the drain hole. If your model lacks a drain hole, you can drill it out. To add a window to your chamber, drill through the cooler using a jigsaw. Cut a piece of plexiglass to fit, then attach it to the cooler using epoxy.

*Equipment tips:*

- Choose a chamber that can hold a large cage trap so you don't have to handle the animal. This is safer for you and less stressful for the animal.
- The animal should be able to sit and rest comfortably within the chamber.
- If the chamber is too tall, or if the vent hole is too low, the animal may be able to lift its head above the level of CO<sub>2</sub> gas, which would make the process take longer.
- The chamber is NOT supposed to be airtight! Air must be able to escape to leave room for the carbon dioxide. Carbon dioxide is heavier than air, so it fills from the bottom up (like filling a glass of water). A vent hole near the top of the chamber or a loosely-fitted lid will let out the air but not the CO<sub>2</sub>. The vent hole will also prevent pressure buildup.
- Have a spare tank of CO<sub>2</sub> ready.
- Don't mess around with dry ice, fire extinguishers, car exhaust, or antacids as sources of carbon dioxide. They will not work reliably.

*Technique tips:*

- Always work in a well-ventilated space to minimize your exposure to the CO<sub>2</sub>, which can be dangerous to people, too.
- Attach the hose from the CO<sub>2</sub> tank to the bottom of the chamber.
- Ideally, carbon dioxide should enter the chamber at a rate that displaces 20% of the oxygen each minute (more on this later).
- Should you fill the chamber with CO<sub>2</sub> before putting the animal in it? (This is called "precharging.") Some experts say "yes," others "no." Precharging will speed up the process but many animals will react violently to high concentrations of CO<sub>2</sub> if they're awake. It's less stressful to expose the animal to the gas at a carefully controlled rate. Right now, we say "no," but watch for more research.
- Even if you have a commercial carbon dioxide chamber, you may want to consider building your own mobile unit.
- The chamber should be cleaned and aired out between uses. (A good reason to have more than one chamber.)

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*Using a CO<sub>2</sub> chamber, step-by-step:*

**1.** Calculate the optimal CO<sub>2</sub> flow for your chamber. This depends on the chamber's size. Your math has to be done in the same units used by the flow regulator. Most are either calibrated in cubic feet/hour or liters/minute. If your flow regulator is calibrated to measure the amount of gas flow in "cubic feet/hour," here's how to convert your measurements to match:

**1a.** Measure the chamber's size  
(for this example, say it's 14" x 14" x 34")

**1b.** Convert this measurement into cubic feet  
first, divide each measurement by 12

$$14 \div 12 = 1.2$$

$$14 \div 12 = 1.2$$

$$34 \div 12 = 2.8$$

then multiply the three measurements

$$1.2 \times 1.2 \times 2.8 = 4 \text{ cu. ft.}$$

**1c.** Divide the chamber's size (in cubic feet) by the accepted amount of time (5 minutes, or .08 hours) to determine the flow rate:  $4 \div 0.08 = 50 \text{ cu.ft./hour}$ . So in this example, the ideal flow rate for this chamber is 50 cubic feet/hour.

**2.** Place the animal into the chamber. If it's in a trap, you can put the entire trap into the chamber.

**3.** Turn on the carbon dioxide gas until the flow regulator shows the flow rate you've just calculated.

**4.** Watch the animal. At first, the animal may move about or seem excitable. That's a normal reaction that

often happens right before the animal loses consciousness. If you see signs of extreme distress (excessive vocalizations, head shaking, fierce sneezing) turn down the flow rate. Later on, when the animal's totally unconscious, it may still continue to move. That's a reflex, not a sign of pain. Some NWCOs find that skunks react better to a slower flow rate.

**5.** Wait a few minutes after the animal's stopped moving and then turn off the gas. You can leave the animal in the chamber a little longer, if you'd like. It's important to confirm that the animal is dead because if it isn't and you expose it to air, it could revive. How can you tell? Touch a long stick to its eyeball. If it's dead, it won't blink. Or hang a string in front of its nose (just keep your hands away from the animal's teeth). If it's dead, the string will stay still, because there won't be any breath to move it.

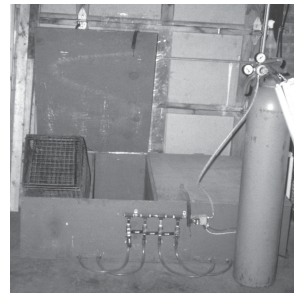
**6.** If the animal's not dead, or if you're not sure, put it back in the chamber and repeat the process, or use another method.

Advantages of carbon dioxide chambers:

- it's been well-studied and has proved highly reliable
- one of the most practical techniques for NWCOs
- does not interfere with rabies testing
- equipment is easy to get and reasonably priced, or can be made easily
- can be done on-site
- poses few hazards to people
- doesn't require special skills, strength, or additional permits
- some of your customers may prefer this method, so there may be marketing advantages to its use

Disadvantages:

- may not work as well with burrowing or diving mammals; reptiles; amphibians; animals that are old or very young (less than 2 weeks old); weak animals; and those that are sick with a respiratory disease
- may be slower than some of the other humane killing methods
- may cause distress at first
- equipment is a bit bulkier, and requires cleaning and airing between uses
- you have to do a little math



This CO<sub>2</sub> chamber can hold large cage traps. That's good, because it means you don't have to handle the animal to place it in the chamber.

Notice that the tubes feed the gas into the bottom of the chamber. CO<sub>2</sub> is heavier than air, so the chamber will fill from the bottom up.

## CERVICAL DISLOCATION

This method is commonly referred to as “breaking the neck” but would more accurately be described as “snapping the spine.” The goal is to quickly separate the spinal cord from the brain to provide a fast and painless death. The separation must take place at the base of the brain or within the upper third of the neck (the cervical spine area).

This method requires skill, practice, and strength, especially with the larger animals, which have thicker, stronger necks. NWCOs unfamiliar with this technique should receive training and practice on dead animals before attempting this on a live animal.

Cervical dislocation is used primarily for small to medium-sized birds (duck sized or smaller) and small mammals, such as mice and rabbits. Be cautious if working with a mammal, especially a rabies vector species (it's safest to use a different method for them). This technique brings your hands into direct contact with the animal's head near its mouth. Remember that no glove can provide 100% guaranteed protection.

To snap the spine of a pigeon or duck-sized bird, grasp the base of the bird's skull in one hand and its body (usually at the base of the neck) in the other hand. Pull hard and fast—twist your hands in opposite directions.

Another cervical dislocation technique for birds uses pliers or vise grips. For smaller birds (up to 11 oz., about the weight of a pigeon), hold the bird in one hand, and a pair of needle-nose pliers in the other. Place the open pliers over the bird's neck vertebrae (in the cervical spine area). Slide the pliers up the neck until they contact the head and are directly over the first and second vertebra in the top of the neck, which support the skull (the atlas and axis vertebra). Then close the pliers firmly and hold for 2–5 seconds.



For larger birds (12 oz.–3 lbs., the upper limit is about the weight of a gull): Hold the bird in one hand, and a pair of square-jawed vise grips in the other. Adjust the vise grips so its jaws will slide over the bird's neck but not over its head. Then slide the vise grips up to the base of the bird's head. With your other hand, pull the bird's body quickly, to snap its spine (separating the cervical vertebrae from the skull).

To snap the spine of a small mammal or larger bird, put it on a hard, flat surface. Hold a strong stick or metal rod firmly against the base of the animal's skull. Pull its body away from its head in a single, steady motion. Keep the stick in place, then bend the body over the head.

Advantages of cervical dislocation:

- it's one of the fastest humane killing techniques
- no equipment necessary
- can be done discreetly in the field
- if done correctly, it's not bloody

Disadvantages:

- brings your hands into direct contact with the animal's head, which, if dealing with mammals, increases your risk of exposure to rabies
- this technique doesn't look as good as others and may disturb onlookers. Animals often keep moving for several seconds or even minutes after death. That's not a sign of pain; it's a reflex.
- requires skill, speed, and strength
- best restricted to small mammals (excluding the rabies vector species) and birds

## STUNNING

Stunning may be used for two different purposes: it may be intended to make the animal unconscious so another killing method may be used safely, or it may be intended as a primary killing method, in which case it's usually referred to as a "lethal blow."

A lethal blow is a quick, very forceful blow to the head that is meant to kill the animal. It is appropriate for small animals, such as birds, rabbits, and small mammals (mice to squirrel-size). Work on a hard surface. The animal must be properly restrained so you can deliver the blow to the right location, which is the back of the head, unless using a special tool called a "penetrating captive bolt pistol."

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    - **cervical dislocation**
    - **stunning (primary; in combination)**
    - chest compression
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The penetrating captive bolt pistol is a particularly helpful although expensive tool, which is often used on livestock. Powered by gunpowder charges or compressed air, this device forces a metal rod through the animal's skull into its brain. Proper placement of the bolt on the forehead is crucial, so the animal must be securely restrained. And make sure that no one is within the "firing range," which is the length of the bolt, because they could be hurt. (One thing you must watch out for: make sure you have a *penetrating* captive bolt pistol. There are captive bolt pistols that don't penetrate the brain. They just stun the animal.)

All of the cautions that apply to cervical dislocation also apply to the use of a lethal blow, and to stunning. Although a lethal blow by itself may humanely kill the animal, it's best to use a second method to be absolutely sure. Sometimes, NWCs will stun an animal so they can more effectively use the killing method they've chosen. For example, a fox that's been captured using a catchpole may be stunned so it can be safely handled and placed in a carbon dioxide chamber.

Stunning is a less forceful blow delivered to the center of the head. The animal must be properly restrained to ensure the correct positioning of the blow. Once the animal is stunned unconscious, you can choose among several techniques to kill it.

- Stunning and use of carbon dioxide chamber: if an animal has been captured using one of the direct capture techniques, such as with a catchpole, it may be stunned to allow the NWCO to transfer it to the chamber safely.
- Stunning and shooting: if an animal is moving around too much to allow for a proper target, you can stun it into unconsciousness, and then orient it for the best shot. Or perhaps you need to move the animal to a place where it's safer to shoot it.
- Stunning and cervical dislocation: This combination may be used on duck-sized birds, to gain a little more time to properly snap the spine.
- Stunning and decapitation: "Decapitation" means the head is quickly cut from the body. This method works like cervical dislocation. The goal is to quickly separate the spinal cord from the brain to provide a fast and humane death. Decapitation is used primarily for birds that are too large for cervical dislocation, such as geese, and sometimes for snakes. A recently killed snake may bite by reflex, so don't handle its head. Use a heavy knife, ax, hatchet, or bolt cutters to cut the spine of a bird at the base of the head. A long-handled shovel or hoe can be used for a snake. The same uncontrolled movement that is seen after cervical dislocation will follow decapitation. A goose might flop around for up to two minutes. The same safety precautions that apply to cervical dislocation should be considered when using stunning and decapitation. This method is messy and forceful. Blood and brain tissue could be splattered. If dealing with a mammal, the splattering of contaminated brain tissue or saliva could expose you to the rabies virus. (Rabies is not a blood-borne disease.)
- Stunning and bleeding out (or "exsanguination"): the major blood vessels, usually those in the neck, are cut to rapidly drain blood from the body. This ensures death but is a messy and bloody technique.

Advantages of these combination methods:

- stunning the animal first ensures that it is unconscious
- may make a situation safer for the NWCO and other people
- may allow the NWCO to use a preferred killing method, such as shooting or a CO<sub>2</sub> chamber, in a situation in which that method would otherwise be difficult to use

- when properly done, these are fast and humane techniques that quickly break the brain-body connection
- no specialized equipment necessary for some of the combined methods

Disadvantages of these combination methods:

- may bring your hands into direct contact with the animal's head, which, if dealing with mammals, increases your risk of exposure to rabies
- some of these techniques may disturb onlookers. Some are bloody. Animals often keep twitching for several seconds, or even minutes, after death. That's not a sign of pain; it's a reflex
- will likely have more of a mess to clean up (consider working over a tarp to contain the mess)
- may require skill, speed, and strength

## CHEST COMPRESSION

The goal of this method is to quickly stop the heart. This technique may be applied to small to medium-sized birds such as starlings or pigeons (but not diving birds); and small mammals (up to about 15 lbs., which includes animals the size of a young raccoon, or fox). Don't attempt this technique on a larger mammal because you'd be unlikely to accomplish it in a timely and humane fashion. This is not a preferred technique for mammals ranging closer to the fifteen-pound limit, but it is acceptable, and may be your best option in some cases.

For birds:

Bring your thumb and forefinger of one hand under the bird's wing from the back, and hold them against the bird's ribs. Place the forefinger of your other hand against the bird's breastbone ("sternum") just below the spot where the "wishbone" forks. Squeeze your fingers together forcefully and hold the pressure to stop the heart.

For mammals:

First, stun the animal between the eyes to make it unconscious. Then strike it again at the back of the head, which should be a lethal blow. Immobilize the animal by standing on its neck with one of your feet. Locate its heart, then compress the heart by standing on it.

Advantages of chest compression:

- when properly done, this is a fast technique
- no specialized equipment necessary
- may be one of the few practical options available in some situations

Disadvantages:

- may disturb onlookers
- requires skill, speed, and strength

## BARBITURATES

These drugs, such as sodium pentobarbital, sedate and can kill animals by interfering with the central nervous system. Barbiturates are the drugs vets use to “put animals to sleep.” And that’s not a bad description of what it looks like, because they usually work smoothly. Animals must be well restrained for the injection.

This isn’t a practical method for most NWCOs because they don’t have access to the drugs. Even DEC wildlife biologists and university researchers have difficulty securing barbiturates. These are dangerous drugs that can kill people, so their use is heavily regulated by the federal government. Only trained personnel registered with the U.S. Drug Enforcement Agency (such as veterinarians) have access to barbiturates. You’d need a license, and in New York, also a certificate of need from the Department of Health to allow you to use hypodermic needles. There are strict security issues. And lots and lots of paperwork.

There are two possible ways that a NWCO might be able to use this method. First, you could transport the nuisance animal to a veterinary clinic, so the vet can inject it with barbiturates. But is that a great choice? Consider how the capture and transportation could stress the animal—would this cancel out the advantages of the use of barbiturates? Would your customers pay fairly for this service?

In rare cases, a NWCO partners with a veterinarian who agrees to supervise and take responsibility for the NWCO’s use of barbiturates in the field. This is a significant liability risk for the vet, so few are willing or able to offer this assistance.

There are many practical limitations, because the NWCO must go to the vet’s office before going out on each job that requires the use of the drugs. The vet

Best practices for solving a wildlife problem, step-by-step

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    - one-way doors
    - frightening techniques and repellents
  - **Lethal techniques:**
    - lethal traps
    - shooting
    - carbon dioxide chamber
    - cervical dislocation
    - **stunning (primary; in combination)**
    - **chest compression**
    - **barbiturates**
    - pesticides
  - Clean-up and disposal
4. Prevent future problems
5. Evaluate success

would give you the amount needed to kill that animal. Could you fit this into your schedule in any reasonable way?

You must also consider how you’d dispose of the carcass, because barbiturates can persist in the animal’s body. A predator or scavenger that feeds on an animal that was killed by barbiturates might also die.

Advantages of barbiturates:

- one of the fastest and most reliable humane killing methods for small animals
- a gentler process that causes minimal distress
- because barbiturates sedate animals, they may make the handling of a dangerous animal safer
- Although the unconscious animal may gasp right before death, the technique minimizes the thrashing sometimes seen with other killing methods

Disadvantages:

- these drugs are not available to most NWCOs
- these drugs can kill people and other animals
- you’d need to get close enough to the animal to use a dart gun or hypodermic and that may not be possible or safe
- requires special training and additional permits
- the drugs may persist in the carcass and affect any animal that feeds upon it

## PESTICIDES

You'd need another license and would receive separate training in the safe and effective use of pesticides, so we won't even try to summarize it here. There are relatively few pesticides available for the control of wildlife. Most are rodenticides, targeting such rodents as mice and the Norway rat. Fumigants and gas cartridges are registered in New York State to kill Norway rats, woodchucks, chipmunks, voles, and moles in their burrows. There are products, such as Avitrol®, registered for use on birds. Some details are shared in Appendix B. Remember, pesticide regulations and registrations change frequently, so always check for current information.

## Clean-up and disposal of dead animals, contaminated materials

Most NWCOs do a certain amount of cleaning as part of their service. If the site presents a formidable mess, some NWCOs contract for cleaning separately while others recommend a service. Whether you do a little or a lot of cleaning on site, you'll still need to clean your gear and your truck. Here's a quick review. For more details, see chapter four.

Clean and disinfect your equipment with a disinfectant or a 10% chlorine bleach solution—one part bleach to nine parts water. Mix up a new batch each day. Never mix bleach and ammonia!—that forms a toxic gas. For the same reason, don't apply bleach to bird droppings, which also contain ammonia.

Remember, if you're working around bird, bat, or rodent droppings or nest materials, don't stir up dust. Wear the proper safety gear. Use disinfectant to wet down anything that might have been contaminated, including any dead animals. Wipe up with a damp towel or sponge, or use a commercial, heavy-duty vacuum.

Cleaning up after raccoons is a bit trickier. The eggs of the parasite that causes raccoon roundworm are resistant to disinfectants. Areas of soil or concrete that have been contaminated can be flamed thoroughly, using a handheld propane torch (a weed burner). Turn the soil over, then flame it; repeat this process a few times. Metal traps can also be flamed; or you could opt to clean them with boiling water and bleach. To

decontaminate a fireplace, woodstove, and chimney, build a roaring fire. Contaminated materials that can't withstand burning should be cleaned with boiling water and bleach. This is a good option for wooden decks, porches, and contaminated clothing.

If you're dealing with a mangy animal, clean anything that may have picked up mites, such as your clothing, equipment, or truck. The bleach solution is one option, or you can freeze objects, which will kill any mites.

To refresh your memory for safety protocols, here are the diseases you're more likely to encounter when working with:

Birds: histoplasmosis

Bats: histoplasmosis, rabies

Rodents: hantavirus (squirrels often get mange)

Raccoons: rabies, raccoon roundworm, distemper

All of these species attract a variety of parasites, too. And although they don't catch it as often, woodchucks, squirrels, and birds may suffer from raccoon roundworm. Any mammal can be infected with rabies.

Carcasses and other potentially contaminated materials (gloves, protective clothing, nesting materials) must be disposed of properly, because they can also spread diseases. In New York State, the Health Department may give you specific disposal instructions for animal carcasses, which you must follow. Otherwise, the animals and other materials may be buried, burned, or sent to a landfill.

That takes care of health concerns, but most people won't consider a place clean if it still reeks. Some NWCOs simply refer customers to commercial cleaning services. There are many commercial deodorizers that will eliminate wildlife odors. You'll find details in the skunk account.

One expensive machine, an ozone generator, has been marketed to NWCOs as a way to clean or purify air. Here's what the EPA has to say about that. "Often the vendors of ozone generators make statements and distribute material that lead the public to believe that these devices are always safe and effective in controlling indoor air pollution. For almost a century, health professionals have refuted these claims... Ozone can cause health problems at high concentrations." (For the full report, see: [www.epa.gov/iedweb00/pubs/ozonegen.html](http://www.epa.gov/iedweb00/pubs/ozonegen.html)).



### Higher, deeper, further...

- Check catalogs or websites to compare different commercial models of carbon dioxide chambers. Consider buying one, or make your own.
- Attend the DEC fur trapping course to learn more about trapping techniques.
- If you're unfamiliar with certain humane killing techniques but would like the option of using them in your NWCO work, find an experienced wildlife professional who can teach you. Some techniques should be practiced on dead animals (cervical dislocation, decapitation, stunning).
- Attend the DEC hunter education course or an NRA-sponsored firearms safety course, or the pesticide applicator course, if you'd like to use firearms or pesticides (including repellents) in your NWCO work.
- Create the kind of stinky situations you might encounter on the job, then experiment with ways to control the odors. Try out various odor control products. Which work well?
- Read the *2000 Report of the American Veterinarian Medical Association Panel on Euthanasia* (available at: [www.avma.org/resources/euthanasia.pdf](http://www.avma.org/resources/euthanasia.pdf)). In addition to the added information in this report, it has an extensive bibliography that would lead you to other credible sources of information.
- Collect animal skulls. Use them to help employees understand the proper location of a head shot for each of the species you handle (if shooting is a preferred killing method for that species).

## Summary

Before you answer the review questions, you may wish to think about the learning objectives:

- 5.12 Name five nonlethal and two lethal techniques for removing animals from an area.
- 5.13 Once you hit the road, you don't want to waste time driving back to the office. Describe five pieces of equipment you'd keep in your truck so you could respond to a wide variety of nuisance wildlife calls.
- 5.14 Which two animal removal techniques require additional training and other licenses or permits?
- 5.15 List six trapping tips that apply to the use of both live traps and kill traps.

Best practices for solving a wildlife problem, step-by-step

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    - live traps
    - one-way doors
    - frightening techniques and repellents
  - **Lethal techniques:**
    - lethal traps
    - shooting
    - carbon dioxide chamber
    - cervical dislocation
    - stunning (primary method; in combination)
    - chest compression
    - barbiturates
  - **pesticides**
  - **Clean-up and disposal**
4. Prevent future problems
5. Evaluate success

5.16 You need to submit a raccoon for rabies testing. Which killing method can you use?

5.17 Describe how you'd clean an attic that had a family of raccoons living in it. What would you do if they'd been living in the chimney, instead?

## Review questions

13. To use certain techniques, you need additional training and other licenses. This is true for (Check all that apply):

- ☐ trapping
- ☐ use of pesticides
- ☐ installing one-way doors
- ☐ use of barbiturates
- ☐ hazing with dogs
- ☐ use of chemical repellents

14a. If you must submit a specimen for a rabies test, certain techniques should not be used to kill the animal. Which ones could interfere with the test? (Check all that apply)

- ☐ shooting (in the head)
- ☐ cervical dislocation
- ☐ carbon dioxide chamber
- ☐ decapitation
- ☐ lethal trap
- ☐ stunning and exsanguination

14b. Which of the remaining techniques would you avoid using in this case, because they might put you at risk? (Check all that apply)

- ☐ shooting (in the head)
- ☐ cervical dislocation
- ☐ carbon dioxide chamber
- ☐ decapitation
- ☐ lethal trap
- ☐ stunning and exsanguination

15. Select the nonlethal techniques a NWCO can use to remove an animal from an area. (Check all that apply).

- ☐ one-way door
- ☐ direct capture
- ☐ snare
- ☐ foothold trap
- ☐ hazing with radio-controlled car or boat
- ☐ chemical repellents
- ☐ cage trap
- ☐ hazing with dogs
- ☐ homemade repellents
- ☐ visual scare devices (scarecrows, mylar tape)
- ☐ noisemakers (propane cannons, bangers)

16. Select the lethal techniques for removing an animal from an area that are available to NWCOs without additional licenses:

- a) lethal trap and shooting
- b) shooting and chemical repellents
- c) rodenticides or other pesticides
- d) barbiturates and CO<sub>2</sub> chamber

17. If you could only pack 5 things to respond to a variety of wildlife problems, which items would you pick?

- a) catchpole; a few cage traps in different sizes; flashlight; a few body-gripping traps in different sizes; and a few kinds of gloves.
- b) A selection of firearms; bleach solution; rodent baits; a few foothold traps in different sizes; catchpole
- c) One-way door; nets; pyrotechnic devices; catchpole; a few cage traps in different sizes
- d) Snake tongs; buckets; respirators; glue boards; a shovel.

18. Which of the following techniques is recommended for cleaning up an area that's been contaminated by raccoons?

- a). Your only option is to burn everything
- b). Burn what you can, then clean the rest with boiling water and bleach, or bury materials deeply

- c). Wet contaminated materials with a disinfectant, then double-bag for disposal
- d). Vacuum the area

### Answers:

13: Pesticides, chemical repellents, barbiturates

14a: Stunning and shooting in the head would damage the brain. This makes it more difficult to work with the sample—but if you've used this technique and need to submit a sample, do it. They may still be able to get valid test results. With a small animal, you might also want to avoid using lethal traps, because it might misfire and hit the head. This isn't much of a problem with animals as big as raccoons or skunks, so for them, this could be acceptable.

14b: We've already ruled out shooting and stunning, and in some cases, lethal traps. To protect yourself from catching rabies, you need to avoid bites, scratches, and contact with saliva or brain tissue. It's best to minimize handling of the animal, and to avoid contact with the head. For those reasons, you might avoid the techniques of decapitation and cervical dislocation (which isn't used on the three rabies vector species—raccoon, skunk, and bat). Both involve handling the animal, and close contact with the head. A CO<sub>2</sub> chamber is a much safer option for the operator.

15: The only things in that list that NWCOs can't use are: snares (illegal in NY, with one exception); chemical repellents; homemade repellents (illegal even if you have a pesticide applicator license). Pyrotechnic devices may be prohibited in certain areas.

16: a (barbiturates are injected, so you need a permit to use a hypodermic—in addition to the supervision by a DEA-registered vet. Chemical repellents and rodenticides are pesticides and require a pesticide applicator license.)

17: a (all of the items are useful to solve certain wildlife problems, but some are more versatile than others. For example, answer "d" includes items that would be very useful if you specialized in snake removal, but not so good for skunks. Some of the items can only be used in certain situations, such as firearms, body-gripping traps, and pyrotechnic devices. Firearms and pesticides (rodent baits) also require additional licenses. Flashlights, respirators, and bleach solution would be good to have along, too.

18: b (Raccoon roundworm eggs are resistant to disinfectants. Vacuuming may remove some eggs, but it's not practical outdoors).

## STEP FOUR: PREVENT FUTURE PROBLEMS

### Learning objectives

- 5.18 *List a dozen tips you could share with your customers to help them reduce the amount of food and shelter available to nuisance wildlife.*
- 5.19 *Before you exclude an animal from an area, you should think about seven issues. Describe them.*
- 5.20 *You've been hired to bat-proof a house. Name three products you could use to seal small holes.*
- 5.21 *Explain the safety issue you need to consider when modifying vents.*
- 5.22 *Raccoons can remove a certain kind of chimney cover. Which one? Describe the type of chimney cover you'd choose to keep a raccoon out of a chimney.*
- 5.23 *Name two devices used to keep pigeons off ledges.*

Most nuisance wildlife control work is in response to a problem that has already happened. Is there a way to turn that around, to actually prevent problems? Or at least, to prevent them from happening over and over and over again? Absolutely, and this is emerging as a more important part of nuisance wildlife control.

There are two major approaches to preventing wildlife conflicts: habitat modification and exclusion. We'll also discuss one strategy that's common in agricultural pest management, which we believe may become an important service offered by some NWCs: monitoring.

### Habitat modification

Animals look for food, water, and shelter. When practical, modifying the environment to reduce the amount of available food, water, or shelter will make the site less attractive to an animal.

Appendices B and C include a series of tip sheets for the animals that are most likely to cause nuisance problems in New York. Each account describes some of the basic biology you need to know to work with this species, and then lists control techniques for that animal.

The following two lists offer some general tips for modifying the habitat to make it less vulnerable to wildlife damage.

#### Best practices for solving a wildlife problem, step-by-step

1. Assess the situation
2. Choose management options
3. Do it (tools and techniques)
4. **PREVENT FUTURE PROBLEMS**
  - **habitat modification**
  - exclusion techniques for
    - holes
    - vents
    - chimneys
    - alcoves, ledges, other places that attract birds
    - outdoor areas
  - monitoring
5. Evaluate success

### REMOVE ARTIFICIAL FOOD SOURCES:

- If anyone is feeding the nuisance animals, persuade them to stop. It may even be illegal. Why? Because an easy food supply can attract a crowd. The wildlife might become dependent on the food source and learn to associate people with food, which could lead to other problems. Also, unnatural crowding is a set-up for the spread of wildlife diseases. The 2003 ban on deer feeding, for example, was put in place to try to prevent the spread of chronic wasting disease to New York State. Report illegal feeding of wildlife to DEC Bureau of Wildlife or law enforcement staff.
- "Animal-proof" the trash. In general, this means you can either keep garbage cans and dumpsters in protected locations, or use strong containers with secure lids. Obviously, a container that's strong enough to keep out mice may not even slow down a bear, so match your approach to the species. Attaching cans to posts will make them harder to tip over.
- Clean garbage cans, chutes, and dumpsters often. Check for cracks and holes. If you find any, repair them.
- Don't leave trash out all night for a morning pick-up. Many of the nuisance species who rummage through trash are nocturnal. If you can, put the trash out right before it's due to be collected.
- Enclose compost piles in a framed box using hardware cloth, or in a sturdy container. Don't compost meat products or cooked food.
- Feed birds during the fall and winter and gradually stop by April. Use sturdy poles for bird feeders. Keep the area underneath the feeder clean. Or use natural landscaping to provide good bird habitat instead. (See

the National Wildlife Federation's backyard wildlife habitat program for information.)

- Feed pets indoors. Any food left outdoors should be removed at night. Bring the food bowls indoors.
- Clean up spills of food, bird seed, grain, garbage. Promptly.
- Remove and properly dispose of livestock carcasses immediately.
- Store food, bird seed, pet food, and grains in strong containers. Keep stored items off the floor and away from walls.
- Near buildings, rake up and remove fruits and nuts that fall off trees.
- Keep livestock feeding areas and grain storage areas as clean and secure as possible.
- Remove dog, cat, and horse droppings daily. (Feces are food to other animals.)
- Eliminate pools of standing water.
- Keep livestock in protected areas, especially when they're ready to have young.
- Switch to landscape plants that the nuisance animal doesn't find as tasty.

#### **LIMIT THEIR SHELTER:**

- Maintain a foot-wide gravel border around the foundation that's free of plants (best) or at least keep foundation plantings well-trimmed. Don't stack anything against the foundation.
- Remove brush piles, junk piles, and clutter. Keep woodpiles away from buildings.
- Keep a clean border around any vulnerable area (building, garden, field, orchard). Mow the grass often. Trim shrubs.
- Mow openings through large patches of thick ground cover. Some animals don't like to cross areas where they can be easily seen. Canada geese, however, would make good use of such openings, so don't use this technique if geese are, or could become, a problem in the area.
- Trim or thin trees to reduce their appeal as roosts.
- Cut trees that brush up against the building and limbs that overhang the roof.
- Wrap guards around trees to keep animals from climbing them. (Best done in late fall, when the wild animals have finished nesting in the tree. Keep the wrap loose so it doesn't girdle the tree.) This will

only prove effective if the tree is isolated enough that animals cannot climb a nearby object and leap into the tree.

- Plus all the exclusion techniques to keep animals out of buildings, gardens, livestock areas, or any other vulnerable location.

## **Exclusion**

Animal-proofing is the best way to prevent damage to buildings, gardens, livestock areas, and valuable agricultural fields. Before you start, there are a few things you need to consider.

### **IS THE ANIMAL IN OR OUT?**

You don't want to trap animals inside because that can lead to worse problems. If you're not sure whether an entry site is active, monitor it for at least two days.

Place a "soft plug" over the hole, such as newspaper, cardboard, or duct tape. Or sprinkle flour on the floor. If you don't see any signs of an animal trying to force its way through the plug, or any tracks in the flour, then you can be reasonably certain there's no wildlife inside—except during the winter. Many animals are less active then, and may not go out on a daily basis.

### **ARE THERE "HIBERNATORS" IN THERE?**

In winter, many animals, such as bats, woodchucks, raccoons, chipmunks, skunks, and snakes are inactive for long periods. You may think that an entry hole is inactive only to be unpleasantly surprised in the spring, or during a warm spell.

The downspout was removed so the one-way door could be installed right in the animal's travel route. Great idea! But if there are young inside, that female will be very motivated to find another way back into the house. She might damage the building to return to her young.



### **ANY YOUNG INSIDE?**

During the spring and summer, the presence of young animals can complicate exclusion. Listen for their sounds, such as high-pitched squealing or chirping, in such places as walls and fireplaces. Another sign, if



you can get close enough, is the condition of the female's teats: they're usually bigger and free of hair when she's nursing. Do your best to avoid creating wildlife orphans. Special care is needed to remove young from buildings.

#### DOES IT WORK?

The durability and effectiveness of an exclusion technique varies by species and situation. For example, bats usually can't chew or claw their way through most exclusion materials. But they're very good at finding tiny, overlooked holes. Raccoons and rodents, on the other hand, are often able to chew or claw through a hasty repair job, or break in by creating a new hole. Be sure your methods are appropriate to the situation.



Can you see the bird exclusion product? The thin plastic spikes are barely visible along the curved ledge. Pigeon droppings would certainly detract from the looks of this historic building far more, and are acidic enough to damage sculptures.

#### HOW DOES IT LOOK?

Some customers will be concerned about choosing options that don't detract from the looks of the building. But don't sacrifice effectiveness just for the sake of attractiveness. For example, if something's chewed a huge hole through a piece of woodwork, just putting up fresh woodwork may not solve the problem. Covering the new wood with metal might be a better, though less attractive, choice (you can disguise the metal by painting it).

#### CAN I DO THIS JOB SAFELY?

Remember the issues discussed in chapter four? You might want to limit roof work during the winter, for example, or seek assistance from someone with needed skills or equipment.

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    - vents
    - chimneys
    - alcoves, ledges, other places that attract birds
    - outdoor areas
  - monitoring
5. Evaluate success

#### ARE THE PRODUCTS AND EXCLUSION TECHNIQUES LEGAL?

Building codes, fire codes, and other local ordinances are important to keep in mind when deciding how to exclude animals. For example, many homemade chimney covers do not meet legal safety requirements, and some communities ban fences or limit their heights. The legal fence may not solve your customer's problem.

#### WILL I NEED ANY SPECIAL TOOLS?

Most exclusion work can be done with general carpentry tools such as hammers, staple guns, screwdrivers, caulking guns, pliers, and tin snips. In addition, you may want to have two battery-powered drills. Why two? First, because you want a back-up in case the battery runs low in one of them. But having two drills can make your work go faster, too. For example, if you need to attach sheet metal to a building, you could use one to drill the holes in the sheet metal and the other to drive the screws into the building. If you used only one drill, you'd have to change bits between these two tasks, which would take longer.

A foam gun (such as the Todol® foam gun) is also recommended. This tool helps you spray expanding foam insulation into cracks and cavities quickly and cleanly. It's particularly useful for bat exclusion.

#### WILL I NEED ANY SPECIAL PRODUCTS?

Yes! There are many materials available that can be used to repair holes in buildings, to screen vulnerable chimneys or vents, or to create barriers around yards and landscape plants. These products vary in their effectiveness, cost, durability, flexibility, and attractive-

ness. And, of course, some are more suitable for use with certain species. Consider an animal's size, habits, and abilities before you choose a product.

Bats, for example, would be top bets for winning a limbo contest. They can squeeze through cracks that are  $\frac{1}{4}$ " wide by  $1\frac{1}{2}$ " long, which is about the size of a stick of gum. That means you'll have to search thoroughly to find all of the possible entry sites. Bats, however, would be a poor bet in a chewing contest. They don't chew holes in buildings, and they aren't likely to chew through whatever you use to plug a hole, so you can use products such as caulk or expanding foam to bat-proof a building.

Now imagine you're trying to exclude mice from the same building. They're roughly the size of some of the small bats, but their abilities and habits are entirely different. Mice could probably chew through caulk so it would be better to use something more durable, such as hardware cloth. Raccoons are strong and can tear off chimney caps that deter squirrels and birds.

NWCOs differ from many building contractors in their expertise in two areas: animal habits and wildlife exclusion devices. Even if you don't want to do the repair, help your customers understand which products to use and how to install them effectively, or recommend a knowledgeable contractor.

Here are some of the products available for excluding wildlife from buildings and landscapes.

## To seal holes, cracks, and gaps:

**Galvanized sheet metal** is durable and, when attached with screws, resistant to removal by raccoons and other animals. But it can be hard to bend and fit around corners.

**Galvanized hardware cloth** (or "metal mesh") is easier to shape than sheet metal and is reasonably durable. Hardware cloth is generally available in quarter-inch and half-inch mesh sizes. Half-inch hardware cloth is stronger but less flexible than quarter-inch. To keep smaller animals, such as bats or mice, out of an area, use quarter-inch hardware cloth. Hardware cloth is often used to create fences.

**Stainless steel or vinyl-coated hardware cloth** is stronger than galvanized, and will never rust. The

disadvantages of stainless steel is that it's much more expensive and harder to cut and shape.

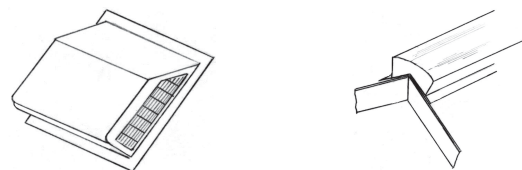
**Vinyl-coated, welded wire mesh** is even stronger than hardware cloth. It lasts longer and will never rust (one manufacturer guarantees its product for seven years when used *in the ocean*), but it is more expensive than hardware cloth. Welded wire mesh is sold in rolls and is available in different heights, gauges, and mesh sizes. Some NWCOs prefer to use welded wire mesh to create rat walls and for any other installation that's meant to last a long time. Recommended size for larger animals is 1 x 1" mesh, while  $\frac{1}{2}$  x  $\frac{1}{2}$ " mesh is suitable for most smaller animals.

**Aluminum flashing** is flexible and relatively easy to shape around corners. It's best for bird and bat exclusion because raccoons and rodents can usually chew or claw through it. Other exclusion materials include **caulk, sealant** (for movable joints), **copper mesh** (this resembles steel wool, but doesn't rust; typical brands include Stuf-Fit™) and **expanding foam insulation**. These materials are great for sealing cracks and other small openings.

## To protect vents:

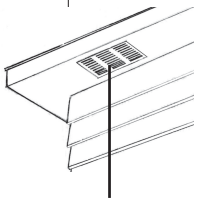
Animals frequently enter buildings through vents. Replace damaged and vulnerable vents with sturdier, more animal-proof designs. Some vents can be modified with homemade screens. For example, you could attach quarter-inch hardware cloth to screen a kitchen hood vent, or protect an attic fan. Just be careful that you don't reduce the amount of ventilation too much when you're modifying a vent, especially with dryer vents. This could increase the risk of fire. Check the requirements for each piece of equipment before you modify the vent.

Roof vents (or louvers) should be made of either metal or heavy-duty plastic. The best models are totally enclosed to prevent birds and rodents from nesting inside them. There are also commercial stainless steel box screens that are secured over existing vents.



At left: Lomanco® 750 roof vent. Right, a ridgeline vent.

Ridgeline vents come with end caps that frequently work loose. This allows small animals, such as sparrows, mice, and bats to easily get inside attics. Replace the caps to secure these vents.



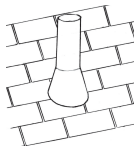
soffit vent seen from below

A wide range of animals, from sparrows to raccoons, often find their way into a building through the ventilation openings in soffits that are located under the eaves. Securely attach metal louvers to the soffit to protect these openings, which are also called “soffit vents.”

Plastic gable louvers on the sides of buildings should be replaced with metal gable louvers. The gaps between individual louver slats should be narrow enough so birds can't nest in them. Screen the back (inside part) of the vent to keep bats and insects out of the attic.

Clothes dryer vents are another popular route indoors used by small animals. Be careful when screening these vents, because lint buildup can damage the dryer and cause fires. Clean the screen frequently or choose a vent design that prevents lint build-up while still excluding animals.

Sewer vent pipes can be covered with commercial shields to prevent rodents and birds from entering the building by slipping through gaps next to the pipes.



sewer vent covered with a pipe shield

## To protect chimneys:

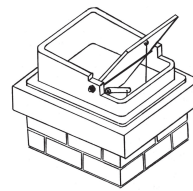
Raccoons, squirrels, bats, many birds, or any animal that dens or nests in a cavity (such as a hole in a tree) will sometimes go down a chimney flue. You can prevent this by installing a chimney cover on the top of the chimney. Commercial models will meet fire codes. Most chimney covers are made of stainless steel or galvanized steel, but there are copper and aluminum models. Some work both as a cover and a damper.

Many chimney cover designs attach to a single tile flue liner. These generally bolt to the outside of the tile liner, or have legs that slip inside the flue. Covers that slip inside the tile liner keep squirrels and birds

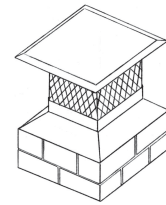
### Best practices for solving a wildlife problem, step-by-step

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    - **vents**
    - **chimneys**
    - alcoves, ledges, places that attract birds
    - outdoor areas
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out, but raccoons can usually remove this kind of cover. If raccoons are a problem, choose a chimney cover that bolts to the side of the flue. Choose models with the smallest openings allowed by fire codes.



Left, chimney cover with damper. Model shown at right attaches to the outside of a tile liner.



Other chimney covers attach to, or around, the top of the chimney. These covers are very helpful if there are several flues in each chimney, or if there are no tile liners extending through the top of the chimney.

There are commercial covers designed to fit metal chimneys. With care, you should be able to enclose the metal chimney cover with half-inch hardware cloth. Several chimney cover manufacturers are able to custom fit covers for unusual chimneys (for a price, of course). Call the manufacturer to find out which chimney measurements are needed.

## To protect alcoves, ledges, and other places that attract birds:

**Netting** is often used to deny birds access to alcoves and other spaces. Bird netting is made from a variety of materials (including polyethylene twine and extruded polypropylene). It's available in different grid sizes and strand width, with specialized hardware to attach the netting to many kinds of materials.

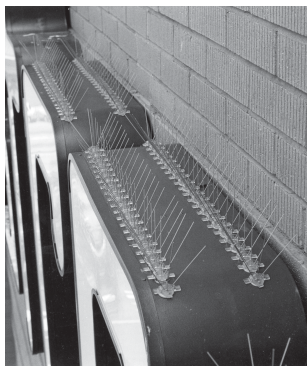
Netting is often the most effective method to control bird damage. The cost varies a lot. Up-front costs may be quite high, because of the labor needed to install the netting (it must remain taut over time, which takes some doing), but it's often economical in the long term. The material tends to last three to ten years.

By converting a flat perch into a sloped one using a piece of **wood or a plexiglass panel**, you can deter birds from landing on ledges and ornamental architectural features.

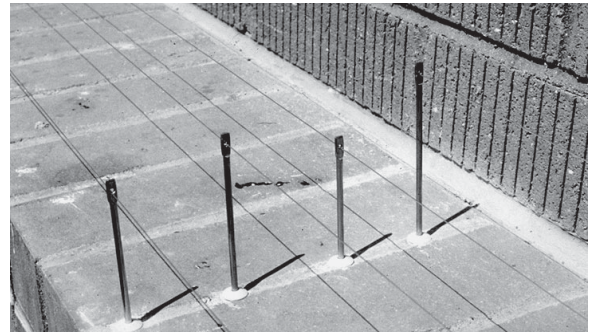
**Metal or plastic spikes** (Catclaw®, Bird-B-Gone®, ECOPIC®, and Nixalite®) help prevent birds from roosting on ledges, roof peaks, window sills, signs, and ornamental architectural features. There are different commercial products available, and there's some variety in the arrangement of the spikes in these products.

Devices that feature sharp stainless steel prongs sticking out in many angles are sometimes called "porcupine wire" because the arrangement resembles a porcupine's spines.

**Metal coils**, which look like a slinky, work the same way as metal spikes (porcupine wire shown in the photo at left, while the photo at right shows a metal coil).



Spikes and coils turn ledges into uncomfortable roosts. (Bird-Flite® Spikes and Bird Coil® from Bird Barrier™.)



The cables in this post-and-wire grid were stretched across this wide ledge, supported by four posts. This shows the parallel line installation. On a narrow ledge, one cable might be enough.

**"Post-and-wire" grids** discourage birds from landing in an area. The grid is made of stainless steel wire, thin cables, high-tech braided fishing line, or 80+-pound test monofilament lines. (Maintaining tension is essential, so steel wire is a better choice for a permanent installation because it will need less maintenance. Monofilament line stretches and can break.)

The cables are stretched tightly over the vulnerable area in a square pattern, as parallel lines, or just as a single line across a narrower area, such as a ledge. Birds react differently to this exclusion technique. It works best to discourage gulls, crows, and pigeons from such areas as rooftops, ledges, landfills, courtyards, and fish hatcheries. If using metal, consider the possibility that this installation could be a lightning hazard.

**Electric shock devices** (Avi-Away®, Flock-Shock®, Flyaway®, VRS®) deliver a nasty enough shock to be taken seriously, but they don't kill the birds. They're used to keep birds off ledges. The cost of installing these systems is often high, but the systems generally have a long working life.

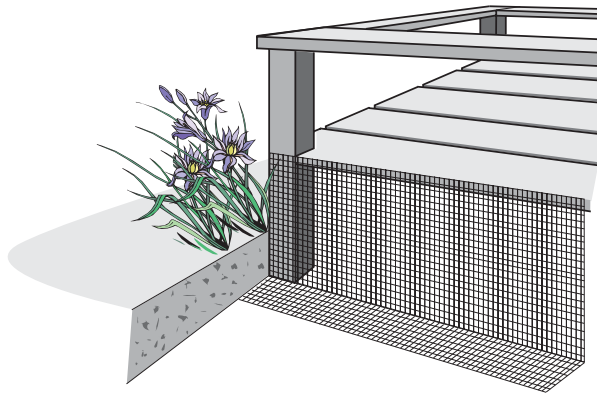
**Commercial plastic strips** can provide bird-proof barriers for doors to warehouses, grain storage areas, and other buildings. These strips can be hung from the top of the doorframe to ground, allowing people and equipment to easily pass through the door.



## To protect outdoor areas:

**Fences** tend to provide the most effective exclusion. They can be made of many materials, such as woven wire, hardware cloth, electrified wire, rope, bird netting, or some combination of materials. Fences vary dramatically in design and cost. This device works on both a small scale (individual plant) and a large scale (garden, field, orchard, park). Some are permanent installations while others are temporary and portable. Permanent fences require maintenance. All fences need to be adequately secured.

The most effective fences are designed with the particular abilities of the target animal in mind. For example, does it jump or burrow? Repellents will sometimes be used in combination with a fence. A cloth dipped in repellent may be tied onto a rope fence, for example—adding oomph to a cheap and simple fence (but that does qualify as a pesticide).



This fence design, called a “rat wall,” is often attached to a foundation, deck, porch, or installed as a free-standing barrier around a garden area. Rat walls are effective against a variety of animals including skunks, woodchucks, raccoons, squirrels, and rats. Match the size of the mesh to the size of the animal you’re trying to exclude.

The top of the fence is attached to a structure. The bottom is buried 6–12” deep. Notice that it’s bent at a 90° angle, forming the letter “L.” This shelf helps to stop animals from digging under the fence. The shelf should stick out 6–12 inches.

One-way doors can be “installed” in rat walls to release the animals. First, attach the rat wall. Leave one or two locations open, and install one-way doors there. Make sure the animal can’t dislodge or dig underneath the one-way doors. When there’s been no sign of animal activity for several days, remove the one-way doors and finish the exclusion. (An easy way to test for animal activity is to put some nontoxic tracking powder or flour on the ground under the porch, in the animal’s travel route. Check later for tracks.)

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**Tree wrap, tree guards, and chicken wire cages,** and hardware cloth can be wrapped around trees and shrubs, or draped over individual plants to protect them from being chewed or girdled. Keep the mesh about an inch away from the plant so it has some room to grow. Don’t staple the material to the tree because that could lead to rot. Later on, if someone wanted to cut that tree down, the staples could prove dangerous.

## Monitoring

Here’s a strategy that has a key role in modern agricultural pest management, which might be very useful for NWCs, especially those who service apartment complexes, large properties, or have corporate accounts. It may give you the chance to use your knowledge to promote a better approach to wildlife damage management. This can be good for your customers, for wildlife, and for your bottom line, all at the same time.

Monitoring refers to the routine inspection of a site to evaluate its current condition and look for vulnerabilities that could lead to wildlife conflicts later on. You gather the information your customer needs to make better decisions, then offer advice. Monitoring often helps people save money because you catch a problem when it’s small and easier to manage, or better yet, you prevent it from happening altogether.

In agriculture, pests aren’t controlled until monitoring reveals that their activity has reached a certain level—above the threshold, the point at which it pays to deal with the situation. In some cases, thresholds are very precise: “four flies on each leg of the cow counted during a ten-minute period,” for example.

So how does this apply to nuisance wildlife control? Your customers are probably most concerned about three things: health and safety; economic damage; and quality of life issues. How bad does a nuisance wildlife situation have to be in order to justify control? You may be able to sit down with your customer and establish your own guidelines. Your customer might be willing to tolerate woodpeckers banging on a metal gutter but not squirrels in the attic, for example.

Or maybe you just skip the idea of thresholds altogether because your customer doesn't want any wildlife damage at all. Instead, you just agree on an inspection schedule. Your goal is to prevent problems. After a very thorough initial inspection, maybe you go out once a month. Homeowners might be willing to pay for an annual inspection.

Since monitoring isn't widely used in nuisance wildlife control work, you may need to explain the idea to convince your customers that this is a best practice. Pictures showing actual wildlife damage can help people understand the economic risks. Let them know how much the repairs cost for each of those situations. Compare that to the cost of an inspection. The best way to solve a wildlife conflict is to prevent it. Monitoring might be a way to achieve that goal.

## Summary

Before you answer the review questions, you may wish to think about the learning objectives:

- 5.18 *List a dozen tips you could share with your customers to help them reduce the amount of food and shelter available to nuisance wildlife.*
- 5.19 *Before you exclude an animal from an area, you should think about seven issues. Describe them.*
- 5.20 *You've been hired to bat-proof a house. Name three products you could use to seal small holes.*
- 5.21 *Explain the safety issue you need to consider when modifying vents.*
- 5.22 *Raccoons can remove a certain kind of chimney cover. Which one? Describe the type of chimney cover you'd choose to keep a raccoon out of a chimney.*
- 5.23 *Name two devices used to keep pigeons off ledges.*

## Review questions

- 18. Which type of chimney cover is best to use if you're trying to exclude a raccoon?
  - a) one that slips inside the tile liner
  - b) one that bolts to the outside of the chimney
- 19. Before you modify a vent to make it animal-proof, you should:
  - a) clean it
  - b) check the ventilation requirements of the equipment to make sure your modification meets fire safety standards
  - c) paint it
  - d) spray it with a repellent
- 20. Just as there are issues to consider before you choose a removal method, there are 7 things to think about before you exclude an animal from an area. They are:
  - a) practicality; legality; effectiveness of technique; safety; does the customer like the product; could there be young trapped inside; do I have to use a ladder; and is it weather-proof?
  - b) Local laws; effectiveness of technique; safety; speed; cost; do I have time to do this now; how good does it look?
  - c) Could animals be hibernating inside; is the technique effective; what are the chances of trapping young inside; is this legal; am I sure I removed all of the animals? Is this safe; and how will it look when I'm done?
- 21. To keep pigeons off a ledge, you could use:
  - a) plastic strips and ultrasonic devices
  - b) porcupine wire and electric shock devices
  - c) netting or parallel cables stretched tightly across the ledge
  - d) metal coils or bubblegum
  - e) answers "b" and "c" are correct
- 22. To keep bats from crawling through small holes, seal the holes with:
  - a) caulk,  $\frac{1}{2}$ " hardware cloth, expanding foam
  - b)  $\frac{1}{4}$ " hardware cloth, copper gauze, caulk
  - c) aluminum flashing, expanding foam, sealant
  - d) answers "b" and "c" are correct

23. Select all of the tips you'd suggest to a customer to help them reduce the amount of food and shelter available to mice:

- ☐ keep area under the bird feeder clean
- ☐ maintain a foot-wide gravel border around the foundation
- ☐ enclose the compost pile
- ☐ rake up fruits and nuts that have fallen off trees
- ☐ clean up spills of food, grain, garbage
- ☐ mow the grass, and keep shrubs well-trimmed
- ☐ remove brush piles, junk piles, clutter
- ☐ store food in strong containers
- ☐ remove pet food once they're done eating
- ☐ wrap trees with tree guard
- ☐ don't stack things against the foundation
- ☐ store goods, especially grains, pet food, and bird seed, off the floor and away from the walls
- ☐ switch to landscape plants that mice don't find as tasty
- ☐ bring chickens into their coop at night
- ☐ keep livestock feeding areas and grain storage areas as clean as possible
- ☐ animal-proof the trash
- ☐ don't leave the trash out at night
- ☐ keep livestock in protected areas

Answers:

18: b

19: b

20: c (answer "a" missed concerns about trapping animals inside, either because they're hibernating, young and immobile, or because you missed some while trapping. It also forgot to mention your safety. Answer "b" missed concerns about hibernating animals and some that might have been missed during your capture).

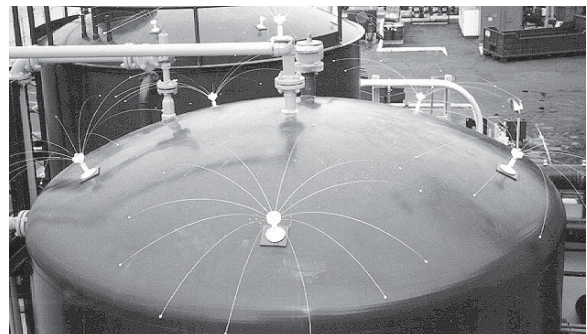
21: e (answer "a" is wrong because birds can't hear ultrasonic devices, so they don't respond to them. Answer "d" is wrong because bubblegum won't deter pigeons).

22: d (the mesh size of the hardware cloth in answer "a" is too big for bats).

23: Almost all of these ideas apply to mice, except: mice don't attack livestock. They're also not as likely to damage trees or landscape plants, although they might do so. It's true that mice are not strictly nocturnal, but they are more active at night, so there may be some benefit to removing trash at night.

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The spider-like devices on the top of this tank are called "Daddy Long Legs"®. The steel rods move in the breeze, scaring birds away from landing on the tank. Scare devices that move are generally more effective than stationary objects.

## STEP FIVE: EVALUATE SUCCESS

### *Learning objectives*

- 5.24 Describe two benefits you might gain from evaluating your work.
- 5.25 List three different evaluation methods.

So you've finished the job. It's time to tip your hat and ride off into the sunset, right? Well, maybe not. Have you really been successful? Or is the "problem" just waiting to re-emerge, like some bad horror movie that spawns thirteen sequels?

Should you care? Why spend time on follow-up, when you're already so busy? After all, you're confident that you do good work, so you expect success. But it's not a bad idea to figure out how successful you've been. How happy is your customer with the work now?

Evaluations help you to improve your control techniques and your business planning, if that's relevant. For example, after studying his records, one NWCO realized that it didn't make financial sense to go out on a call unless he'd earn \$50. Otherwise, he couldn't justify the cost of the truck maintenance, the gas, the time, and all the rest.

There are many ways to evaluate your success. A low-key approach might simply be to give your customers your card, and ask them to call you if they have any problems. But keep in mind that many people don't return to a business if they're unhappy—they go to someone else. And they often tell friends and acquaintances about the raw deal that they believed they received. In other words, no news is not necessarily good news.

You could plan a follow-up visit to personally evaluate your success. This, of course, takes time, but you could view this as marketing effort. Many customers will really appreciate this extra effort, and that could lead to great word-of-mouth advertising. Also, you see the situation yourself, instead of relying on someone else's description. Be sure to leave an inspection report (preferably written) with the client.

If you can't invest the time to go back to all these sites, you could call or email your customers, or leave

them a brief evaluation form to fill out and return (use a postcard with your address printed on it, and provide the postage. Then, all your customer has to do is fill out the form and drop it in the mail).

If you are performing nuisance control work to make money, you'll want to know how well you're doing. To figure out your profit margin, keep track of your costs for each job (such as materials and labor). Then add in the overhead (truck payments, gas, insurance, phone, taxes, marketing costs, and maintenance and replacement of equipment, for example). Your income, minus your costs of doing business, is your profit margin.

Once you know your exact profit margin, you can think about all sorts of questions that might affect how you run your business. For example, are you consistently making money on certain types of jobs while losing money on others? Then maybe you'd decide to specialize in the profitable work. Or increase the price for the less profitable jobs. On the other hand, some people consider the low-cost, less profitable jobs as a way to build your client base.

Evaluation helps you become a better NWCO. No matter how often you do it, you can still learn something new.



Some jobs demand a little ingenuity and a little duct tape. The cage trap was too big to fit into the woodstove, so the NWCO moved the stove and attached the trap directly to the chimney pipe. He's placed newspaper under the trap to protect the trunk from urine stains. Was the customer happy with this solution? Can you think of another way to solve this problem?



### Higher, deeper, further...

- Design a postcard you could use to ask your customers to evaluate your work.
- Write a few questions you might ask customers when calling to discuss their satisfaction.
- Start keeping track of the costs of each job. Figure out your profit margin.
- Find a small group of trusted NWCOs who all want to improve their skills. Get together once a month to share tips and discuss any problems you encountered on the job.
- Join a professional organization. It's a great way to learn from your peers, and to find out about new developments in the industry.
- Learn more about housing construction. How does the unseen, internal structure of walls, roofs, and foundations affect your NWCO work? Talk to some contractors. Ask them where buildings are most vulnerable, and therefore, more likely to be invaded by wildlife.

## Summary

Before you answer the review questions, you may wish to think about the learning objectives:

5.24 Describe two benefits you might gain from evaluating your work.

5.25 List three different evaluation methods.

## Review questions

24. To evaluate your work, you might:

- a) call your customer
- b) send a postcard or email questionnaire
- c) visit the site again
- d) all of the above

25. What benefits might you gain from evaluating your work?

- a) you can compare the long-term effectiveness of different products and techniques

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5. **Evaluate success**

- b) you further impress your customers, which is good advertising for your business
- c) you can determine your profit margin, which may guide your business planning
- d) all of the above

Answers:

24: d

25: d



Sometimes you cannot place your traps inside the building because you can't get to the attic or the rafter wouldn't support your weight. If you need to set a trap outdoors, especially in an area where it's visible to many people, cover the trap. If it's a live trap, this may help to protect the animal from the weather and predators. People are less likely to interfere, too. (Some might try to free the animal, which, as you know, is not necessarily humane. Some might taunt the animal. Others might vandalize or steal a trap.) Discretion is also important when setting a lethal trap outdoors.