



Got Bats?

A BC Guide for Managing
Bats in Buildings



October 2017

Photo by Jared Hobbs

Bats are neither rodents nor considered pests under BC law. They are classified as wildlife under the BC Wildlife Act and are protected from harassment and killing.

Acknowledgments

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Background

All bat species in British Columbia are protected under the BC Wildlife Act. BC has the highest bat diversity of any Canadian province with 16 species identified to date. Some species are found throughout the province while others live in specific areas, particularly the Okanagan. Some of these species are considered “at risk” due to a variety of factors including habitat loss, wind turbines, restricted distribution, and susceptibility to white-nose syndrome (WNS). WNS is a deadly disease caused by an introduced fungus that is decimating bat populations. Some bat species have experienced catastrophic population declines elsewhere in North America where the disease occurs. Bats are an essential component of healthy ecosystems and provide important control of agriculture and forest insect pests as well as a natural method of control of mosquito populations. The purpose of this document is to provide information about bats in buildings including options for maintaining bat roosts, excluding bats from buildings, and enhancing bat habitat. These practices are recommended for use with all structure-dwelling bat species, regardless of their conservation status. This document is the basis for a companion: *Got Bats?: 7 Steps to Excluding Bats from Buildings* available at www.bcbats.ca.

What’s Inside this Guide

This document provides guidance on best practices for managing bats in buildings to promote bat conservation while successfully addressing homeowner concerns.

- Bat Basics
- Bats in Buildings
- Landowner Stewardship
- Types of Bat Roosts
- Options for Managing Bats
- Promoting Bat Conservation

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Bat Basics

A great deal of misinformation exists about bats. Below are some basic bat facts:

- Bats are neither rodents nor considered pests under BC law. They are classified as wildlife under the BC Wildlife Act and thus are protected from harassment and killing.
- Unlike rodents, bats do not build nests and they do not chew or claw their way into a structure, but instead take advantage of small structural openings or areas of disrepair on the outside of a building.
- Bats are important to our ecosystems and ultimately our economy. All bat species in Canada eat insects and other arthropods, including insects that impact agricultural and forestry resources and disease-spreading pests such as mosquitoes.
- As the only flying mammals, bats hang upside down to allow them to drop head first to take flight quickly. Unlike birds, bats are unable to lift off from the ground to take flight.
- Bats have inspired scientific advancements for humans including navigational aids for the blind, blood-clot medications, low-temperature surgery, military sonar, and longevity research.
- Over half of the sixteen species of bats in BC are of conservation concern due to population declines or restricted ranges.
- Since the devastating fungus causing white-nose syndrome was introduced to eastern North America in 2006, more than 5.7 million bats have died from the disease. As of November 2015, WNS has been confirmed in 5 Canadian provinces and 26 eastern US states but is not yet known to occur in western North America, including BC. This disease is spreading gradually across the country but there is also a fear that it could be suddenly introduced via boots or equipment, by humans who have visited caves in areas with WNS.
- Bats are long-lived and have a low reproductive rate. Bats can live over 40 years and most species in BC usually produce only one young per year. As a result, it is very difficult for bats to recover from drastic population declines such as those caused by WNS or a weather event or human-caused catastrophe to a colony.

Did you know?

During the summer, a bat can eat more than half its body weight in insects each night. For example, one Little Brown Myotis can eat 600 mosquitoes or mosquito-sized insects per hour.



Photo by: Jared Hobbs

LONG-LEGGED BAT (MYOTIS VOLANS).

Bats in Buildings

Did you know?

Bats don't chew to alter their environment like rodents do, and so they must rely on existing holes or gaps between boards to gain entry.



Photo by Todd Carnahan

A BIOLOGIST HOLDS A TOWNSEND'S BIG-EARED BAT (*CORYNORHINUS TOWNSENDII*).

Buildings and other human-made structures can offer warm, safe shelters for some bat species. Four bat species regularly roost in buildings in BC although several other species are sometimes discovered. Often the warm and dry conditions of buildings make them particularly suitable for female bats to birth and raise their single pup. In addition, buildings can serve as temporary night roosts (rest stops during a night of foraging) and migratory stop-overs.

Buildings have become an important resource for bats where natural roosting habitat is limited. For example, natural structures like wildlife trees (large trees with cavities or loose bark) are often felled because of forest harvesting or safety concerns. Consequently, structure-dwelling bats are more noticed by people, and are considered a nuisance or health concern by some. Although buildings can provide optimal conditions for roosting, bats in these structures are vulnerable to human disturbance or injury, either by intentional or accidental means.

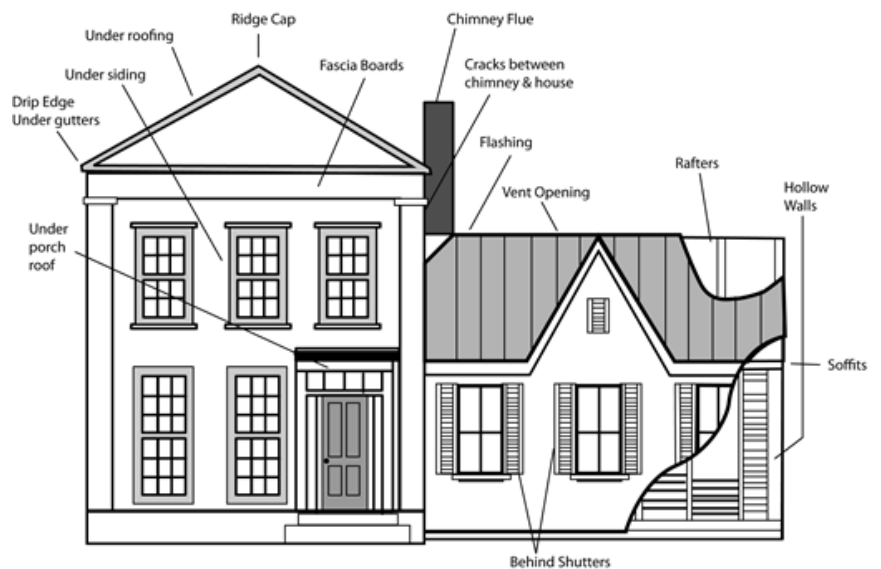


DIAGRAM OF A HOUSE SHOWING POSSIBLE ROOST SITES FOR BATS

Bats may roost in many parts of a building structure including under roofing, siding, fascia boards, flashing and rafters, in cracks of the chimney or walls, behind shutters or under a porch roof. Sometimes bats appear to be roosting inside a house when in fact they are simply under roofing or fascia, and may not cause a problem for the homeowner. Bats don't chew to alter their environment like rodents do, and so they must rely on existing holes or gaps to gain entry, although they can chew through plastic mesh when they are trapped.

³ Drawn for the Kootenay Community Bat Project based on original drawing by Dr. Stephen C. Frantz, Global Environmental Options, LLC.

Which Bats use Buildings?

Four bat species regularly roost in BC buildings although several other species are sometimes discovered. The most common species are the Little Brown Myotis, the Yuma Myotis, and the Big Brown Bat. The rare Townsend's Big-eared Bat is also found in buildings and is easy to identify because of its long ears and tendency to roost in clusters on rafters in very open spaces. Long-eared Myotis, Fringed Myotis, Long-legged Myotis, California Myotis, Western Small-footed Myotis, Pallid Bats, Northern Myotis, and Silver-haired bats will also use buildings but are not found as often in such roost types. For a list of bat species by region of BC, see www.bcbats.ca.

Little Brown Myotis

The Little Brown Myotis (*Myotis lucifugus*), also called the little brown bat, is a common species that roosts in buildings and is found throughout BC. This bat is a medium-sized species weighing about 6 grams. The fur on its back varies in colour, ranging from yellow or olive in the dry interior to blackish in coastal populations. The fur on its underside is lighter, varying from light brown to tan. It is very difficult to tell apart from the Yuma Myotis without using acoustic equipment or DNA testing. Little Brown Myotis roost in a variety of habitats including buildings, mines, caves, rock crevices and cliffs. Little Brown Myotis eat aquatic insects such as midges, caddisflies and mayflies as well as beetles, moths, mosquitoes, spiders, and various types of flies. The Little Brown Myotis has recently been listed as federally Endangered in Canada due to the devastating impacts of White-nose syndrome in eastern Canada and the United States where the disease occurs. Colonies can be quite large, numbering in the hundreds.

Yuma Myotis

The Yuma Myotis (*Myotis yumanensis*) is another common species that roosts in buildings in BC and is known in the southern half of the province. This medium-sized bat weighs about 6 grams. The fur on its back varies from pale brown to nearly black, while the fur on its underside is lighter. Yuma Myotis roost in buildings, snags, rock crevices and mines. This species of bat forms the largest maternity colonies in BC, which can number in the hundreds or thousands. Similar to Little Brown Myotis, Yuma Myotis eat a variety of insects including mayflies, caddisflies and midges. Yuma Myotis are similar in size and appearance to Little Brown Myotis, and share a similar ecology.



LITTLE BROWN BAT (*MYOTIS LUCIFUGUS*).



YUMA MYOTIS (*MYOTIS YUMANENSIS*) ARE A SMALL BAT COMMONLY FOUND IN BUILDINGS.

Which Bats use Buildings?



Photo by Jared Hobbs

Big Brown Bat

The Big Brown Bat (*Eptesicus fuscus*) is one of the larger bats in the province, weighing an average of 15 g. This species has been found in the southern two-thirds of the province as far north as Fort St. John, and may range as far north as the Yukon. This bat has a broad head and nose and long fur which varies from pale to dark brown. Big Brown Bats roost in buildings (commonly around chimney flashing) as well as in snags, cliffs, rock crevices and mines. In buildings, this species forms relatively small colonies of up to 50 individuals but typically fewer than ten. Big Brown Bats have strong jaws that are well-adapted to eating beetles as well as moths, carpenter ants, termites, lacewings and various flies.

Townsend's Big-Eared Bat



Photo by Jared Hobbs

© Jared Hobbs

TOWNSEND'S BIG-EARED BAT (*CORYNORHINUS TOWNSENDII*).

The Townsend's Big-Eared Bat (*Corynorhinus townsendii*) is a medium-sized bat with enormous ears. It weighs an average of 8.5 g. This species is found in the southern portion of the province, south of Williams Lake. It has pale fur, glandular swellings on its nose, and unmistakably large ears that it sometimes folds along its back. Townsend's Big-Eared Bats roost in open chambers of buildings (not in crevices like the other species), as well as cliffs, caves and mines. In maternity colonies, these bats roost in tight clusters to conserve heat. They are sensitive to intrusions at their roost and can abandon their roost if they are disturbed frequently. They eat moths, lacewings, sawflies and flies. The Townsend's Big-Eared Bat is a species at risk in BC on the "blue list" which means their populations are vulnerable.

Landowner Stewardship

Landowners who have bats on their property can play an important role in bat conservation. The roost site may be housing a maternity colony (where multiple females gather to have their pups). The bat species may be a rare “species at risk” for which few roost sites are known, or be among the largest known colony of a species. The roost structure (such as a building, old tree or bat house) may be one of the few suitable summer roosting habitats in the area.

Maintaining and enhancing bat roosting habitat is an important component of promoting backyard biodiversity as well as overall stewardship of bats in BC. Homeowners have an opportunity to contribute to the conservation of bats by following simple guidelines for dealing with bats in buildings. Homeowners are also an important information resource about bat colonies and are encouraged to communicate with their local community bat program or provincial government wildlife biologists to aid in management decisions, regardless of whether a bat colony is being evicted from a structure or not. Community bat program coordinators and provincial wildlife biologists, in turn, can provide additional resources and information on bats to homeowners.



Photo by Juliet Craig

SHED ON PRIVATE LAND THAT IS AN IMPORTANT ROOST SITE FOR A MATERNITY COLONY OF TOWNSEND'S BIG-EARED BATS.



Photo courtesy of Redfish School of Change

The BC Community Bat Program network was established in 2014. To learn more and locate a bat project in your region, see www.bcbats.ca

Types of Bat Roosts

Bat or mouse droppings?

Bat guano forms piles whereas mouse droppings are scattered. Bat droppings crumble when crushed whereas mouse droppings don't. Bat droppings have shiny pieces (insect exoskeletons) whereas mouse droppings have vegetation.



Photo by Juliet Craig.

VIEWING A NURSERY BAT-HOUSE LOOKING UP INTO HOUSE FROM BELOW.

Maternity Roosts

Maternity roosts are sites where multiple females gather to raise pups. Each female bat has only one pup per year. Unlike rodents, bat colonies generally remain stable in number. These roosts are usually easy to detect due to noise, odour, or guano (feces or droppings) and include attics, barns, sheds, siding, and other enclosed spaces. Protection of maternity colonies is an essential component of bat conservation. New maternity colonies may form when bats have been disturbed from another site or an existing site is destroyed and its occupants are forced to relocate.

Day Roosts

Day roosts (including maternity roosts) are sites where bats gather to sleep and live during the day. They can be used by a lone bat (often a male or non-reproductive female) or a colony of females (maternity roost) and their offspring. Usually these roost sites are crevices where bats are protected from the elements and predators. Occasionally a bat may choose a day roost “in the open”, especially pups that are learning to fly. Open day roosts may be located on an outside wall or under a patio umbrella. Day roosts (with the exception of maternity roosts) are often relatively temporary with a bat coming and going over the summer and fall.

Night Roosts

Night roosts are places that bats use temporarily during the night to rest between feeding bouts. Night roosts are often open spaces, such as under bridges, archways above doors, covered patios, and carports. Residents rarely see bats at night roosts but instead observe droppings every morning where the bats were the night before. Bat droppings (guano) resemble large mouse droppings but are comprised of insect exoskeletons and lack a vegetative component. The biggest nuisance with night roosts is cleaning up the guano. However, since guano poses no known health risk in BC and makes an excellent fertilizer, it can be used on the garden. Alternatively, place a plant pot where the guano usually falls to avoid having to clean up, or place a shelf or gutter along the wall below the night roost to catch guano before it falls to the floor. The presence of a night roost does not necessarily indicate that bats are inside the building and the limited use of a night roost is not usually a problem for homeowners. For information on managing night roosts, see “Got Bats? 7 Steps for Excluding Bats from Buildings in BC”.

⁶ Drawn for the Kootenay Community Bat Project based on original drawing by Dr. Stephen C. Frantz, Global Environmental Options, LLC.

Options for Managing bats

The US Centre for Disease Control (CDC) states that “some bats live in buildings and there’s no reason to evict them if there is little chance for contact with people”. In BC, the only known health risk associated with bats is rabies, which requires direct bat-human contact for transmission. There are no other documented health risks to humans from bats in BC.

People with bats in buildings may have no problems with bats or may be able to address the issues without evicting bats. Other people may be willing to have bats stay on their property provided the bats are not in the building (evict bats and install a bat house). There are yet others who simply want to “get rid of the bats”. The best option for the bats is to allow them to remain in their existing roost or, if that is not an option, to find them alternative accommodations such as by installing a bat house.

The problems that can be associated with bats in buildings are often a by-product of bats rather than the bats themselves. Although many homeowners have no problems, issues may include:

- guano – coming into living space, falling on items (e.g., items stored in attic or hay)
- noise – typically in walls
- smell – urine accumulation, permeated insulation
- markings or stains – accumulation of oils, guano and urine on roost entrances
- health concerns – a general misconception of many landowners

To assess whether bat exclusion is required, identify if there are any problems that the bats are creating such as noise, odour or guano accumulation and determine if those issues can be addressed. If bats are not causing any problems or the problems can be adequately mitigated, bats can usually remain using the roost structure. However, where bats persistently find ways into the human living spaces or where guano cannot be regularly cleaned out, exclusion may be the best option.

The US Centre for Disease Control (CDC) states that “some bats live in buildings, and there’s no reason to evict them if there is little chance for contact with people”



COLONY OF YUMA MYOTIS IN ATTIC.

⁷ Kiser, M. and S. Kiser (1999). Bat-houses and exclusions in British Columbia. Bat-house Researcher, 7, 3-4.

⁸ Brittingham, M. C. and L. M. Williams (2000). Bat boxes as alternative roosts for displaced bat maternity colonies. Wildlife Society Bulletin, 28, 197-207.

Option 1: Leave Bats Where They Are



Photo by Juliet Craig.

BATS OCCUPYING BUILDINGS MAY NOT NEED EVICTION IF HUMAN LIVING SPACES CAN BE PROTECTED.



Photo by Juliet Craig.

TOWNSEND'S BIG-EARED BATS (*CORYNORHINUS TOWNSENDII*) ARE OCCASIONALLY FOUND IN BUILDINGS.

The best option for the bats is to remain where they are. They have selected a roost site that has suitable temperature, security, and other features for them. In some cases, bats have been using a building for many decades with no problem for landowners. Situations where bats can be left where they are may include:

- Bats roosts are in a location such as a shed or barn
- Human living quarters are separated (or can be) from the bat roost
- Issues of smell, noise or guano can be addressed while still maintaining bat colony
- Exclusion too costly or otherwise not feasible
- Hazards causing bat mortality can be reduced
- This building is a night roost only

In many cases, such as bats in a barn, shed, or bat house, there are no issues with the bat colony and no action is required. Landowners are often happy to have bats on their property to assist with insect control or to promote backyard biodiversity. In other cases, landowners may wish to maintain the colony but need to deal with issues of noise, smell or guano or bats entering human living quarters.

Addressing Health Concerns

The primary health risk associated with bats in BC is exposure to rabies. Rabies virus is a serious human health concern and, in BC, bats are the only animals in the province that serve as a reservoir for the virus. Bats, like all mammals, can contract rabies, and when they do they die from it. Humans can contract the virus if they are bitten by an infected bat. Since only a very small percentage of bats carry rabies, the risk is considered very low. Contracting rabies requires direct human-bat contact, usually through a bite, so do not handle bats with bare hands. If you are in contact with an infected bat, post-exposure treatment should be administered promptly by a medical professional after being bitten.

Bats exhibiting unusual behavior, such as flying during the day, flopping on the ground, or showing no fear of humans, should be treated with care. Avoid the area where the bat is and keep pets inside. Ensuring that bats cannot access human living quarters will mitigate the risk of rabies (see next section). Histoplasmosis (a lung disease caused by the inhalation of *Histoplasma capsulatum* fungal spores that grow on animal feces) is a concern in eastern North America but has never been documented from bat droppings in BC.

Option 1: Leave Bats Where They Are

Sealing Human Living Quarters

Bat-human contact can be prevented by ensuring that all openings between the bat roost site and human living quarters are properly sealed. Bats typically enter the building and go straight to their roost location. Bats do not go exploring through the house as mice do. Entry into human living quarters is typically the result of bats falling down a chimney or other chute and not being able to climb out (see Eliminating Hazards section) and/or pups getting into trouble when they are learning to fly (usually in late July or August). It is important to ensure the interior of the home is sealed so that all potential entries are blocked. Bat-proofing the human living space (i.e. providing “interior seals”) can be carried out at any time of year.

The first step in this work consists of locating openings (typically areas where air flows) leading into the living space from attics, garages, walls, or any place that bats are roosting. Entry/exit points can be as small as 15 mm (5/8”) round, or for oblong openings, 6 mm (1/4”) wide and 19 mm (3/4”) long. Likely openings may include:

- attic hatches and doors
- chimneys
- fireplaces
- around piping or plumbing
- open windows or loose windowsills
- openings around air conditioners and ducts
- louver fans
- screens in disrepair
- pet doors

Seal gaps (e.g. with caulking, aerosol foam, weather stripping or screening) where bats and guano can enter living quarters, particularly around chimneys. Screen chimneys and seal other ducts and chutes that lead from the roost site into the house at the top of the chute. However, sealing these at the bottom can lead to high bat mortality (see Eliminating Hazards section) if bats slide down these chutes. Bats can only climb up rough surfaces, and cannot fly straight up, thus bottom-sealed chutes can be death traps. Screen off tops of chutes when possible, or provide a rough surface ramp for bats to crawl up and out. Sealing off roost sites from living areas will reduce the entry of odours and guano and prevent bats from accessing the rest of the house. Identifying entry and exit points of the bats will help ensure that modifications do not interrupt bat access to the roost. While bats cannot chew through any of these sealing techniques, rodents can, so layer some steel wool between applications of expanding foam or silicone if these areas are accessible to rodents.

It is the homeowner's responsibility to ensure that any modifications to the home adheres to the BC Building Code and BC Fire Code. These codes ensure that homes meet minimum requirements for safety, health, accessibility, fire and structural protection of buildings and energy and water efficiency.

Option 1: Leave Bats Where They Are



Photo by Juliet Craig.

MODIFICATIONS FOR BAT ROOST SITES INCLUDING PLASTIC SHEETING IN ATTIC TO FACILITATE GUANO REMOVAL AND REDUCE SMELL (ABOVE) AND A TARP HUNG TO PREVENT GUANO FROM FALLING ON HAY IN A BARN (BELOW).



Photo by Juliet Craig.

Mitigating Guano and Smell

In situations where bats do not have contact with humans, the primary issue is usually containment of guano. Containment can often be achieved at relatively low cost. It is also often the best option when exclusion from drafty buildings is virtually impossible. There are strategies to address these issues without excluding bats.

- Accumulated guano can be removed annually after the bats have left for the season. Use appropriate respiratory protection in dusty enclosed areas, especially if there is loose insulation or an unknown amount of mouse droppings. Guano can be used as a garden fertilizer since it is rich in nitrogen.
- Insulation stained by guano or urine can be replaced and plastic or a plywood floor installed along human access routes and under roost(s) to catch guano and facilitate annual removal.
- Attic access for scheduled clean-up can be improved. Consider making a large entry hole, installing pull-down stairs, providing access from the outside of the house through the gable ends, or other such modifications to make it easy to get inside to clean when necessary. Install planks on the floor of the attic to provide a safe walking surface.
- Guano in conspicuous locations, such as on a front entrance or deck, can be deflected or caught by installing shelves, rain gutters or a planter below the roost site.
- Markings on walls can be regularly cleaned. After years of bats coming and going from a roost, the entry area to the roost often becomes stained and this can be cleaned annually (when the bats are absent) if it becomes unsightly.

Reducing Noise

Although the echolocation calls of bats are above the range of human hearing, bats also make vocalizations that are audible to humans. Often these clicks or squeaks are made for communication between a mother and pup or other members of the colony. The noise level often peaks at dusk just prior to emergence and at dawn when foraging bats return to the roost. Bats roosting in attics are seldom heard unless the insulation is very thin. Improving insulation in an attic can reduce problems with noise. Bats in outside walls or around chimneys are often louder and noticed by homeowners. In both instances, remedial work is expensive or may be ineffective. If the sound is intolerable, then evicting the bats to a new location is often the only solution.

⁹ An excellent guide called "Simple Bat Eviction" can be ordered from www.BatHouseGuy.com.

Option 2: Exclude Bats

Eliminating Hazards

Whether you are leaving bats where they are or planning to exclude them, preventing the accidental mortality of bats is critical. There are several objects that act as traps that bats cannot escape from. These types of traps have been known to kill dozens of bats within one summer.:

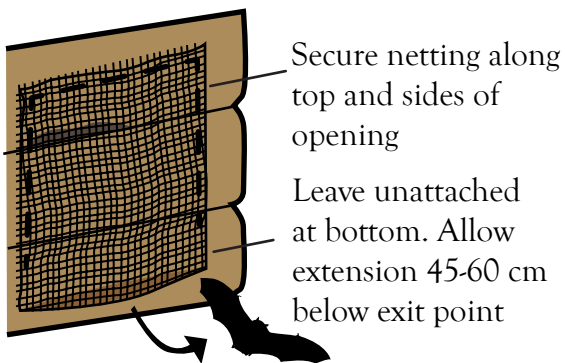
- **Do not place buckets, tubs, garbage pails, or other objects** that bats fall into and can't get out of within the roost or under the entry point. Since bats cannot climb out of structures with smooth surfaces and cannot fly straight up, they require an exit route. Avoid these objects within a bat roost. Where they are required, put in a stick, board or other ramp for bats to climb out.
- **Do not use sticky fly ribbon, glue traps, bird netting and tape** since bats can become entangled in them.
- **Screen chimneys and seal other chutes at the top** of the structure (e.g. ducts, laundry chutes) that lead below the roost site to prevent bats falling down. Be particularly wary of chimneys that have been "cut off" within an attic space (which allows bats to easily go inside them) as well as other chutes that lead to the basement of the house. These chutes provide access to the human living quarters. If the chutes are sealed at the bottom, bats frequently fall down them and can't get back up, leading to extremely high bat mortality and a collection of carcasses that might smell.
- **Ensure there are exit points or coverings in garden ponds, water troughs and rain barrels.** Bats drink on the wing and are occasionally knocked into the water while several are trying to drink. If there is no exit ramp, they may drown. Suitable exiting points may include mesh-covered wood ramps, boards or logs.
- **Keep your cats inside**, particularly at dawn and dusk. Domestic cats are very good hunters and regularly prey upon bats. Keeping your cat indoors, particularly at dawn and dusk, can reduce unnecessary bat mortality. Bats did not evolve with predatory cats so it is not natural for bats to avoid these voracious hunters. Cats can hear the bat echolocation calls so are effective and efficient predators of bats. Although rabies is a low-risk, cats can become infected after contact with a bat so it is best to keep cats from preying on bats if at all possible.



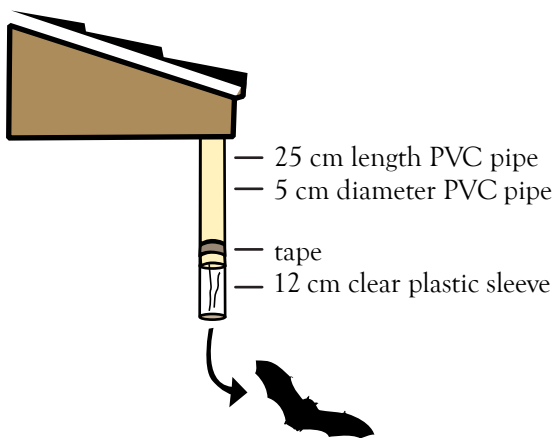
ACCIDENTAL BAT TRAPS INCLUDING AN OLD PAINT TIN, CHIMNEY WITH HATCH CLOSED, AND FLY TAPE. (PHOTOS COURTESY OF JULIET CRAIG AND JEFF PARFITT.)

Option 2: Exclude Bats

Methods that include poisoning, trapping (e.g. cages, sticky traps), exterminating, moving or in any other way harming, harassing, or killing bats are illegal.



ONE-WAY EXIT DEVICE FOR VERTICAL SURFACE USING FIBERGLASS MESH SCREEN.



ONE-WAY EXIT DEVICE USING PIPE EXIT DEVICE FOR HORIZONTAL SURFACE.

Exclude Bats

A second option for the management of bats in buildings is exclusion. Exclusion refers to the practice of physically blocking the entry and exit points of a roost site (while bats are not present) to prevent future use of the building. For details on Exclusion see “Got Bats? 7 Steps for Excluding Bats from Buildings” at www.bcbats.ca. The disadvantage of excluding bats is the reduction of insect control on the property and the potential for the colony to simply move to another building or neighbouring property. Eviction, combined with the installation of a bat house, is the most effective method of “removing” bats from buildings. Exclusion may be the best option if:

- Bat issues cannot be addressed (e.g. guano is inaccessible)
- There are too many gaps into the human living quarters to prevent bat-human contact
- A major renovation or demolition is planned
- Bat hazards cannot be addressed and/or bats are regularly dying

Seven Steps to Eviction

Bat eviction and exclusion must be carefully timed so that bats are not present in the roost. Simply waiting until bats fly out at dusk and blocking the holes is not acceptable in BC since adult or young bats that cannot fly, may still be present in the roost site at all times of day or night. Evicting and excluding bats from a building requires the following seven steps:

Step 1: Know the Basics

Step 2: Access the Situation

Step 3: Protect Human Living Space

Step 4: Identify Entry and Exit Points

Step 5: Install a bat-house prior to Eviction

Step 6: Evict Bats using One-way Exit Device

Step 7: Seal Roost to exclude Bats from Building

For more details on exclusion, see the document, “**7 steps to Exclude Bats from buildings**” at www.bcbats.ca

Option 2: Exclude Bats

Assessing Feasibility of Exclusion

It is important to assess whether an exclusion is feasible before trying to carry it out. In some cases, such as cedar shake roofs, corrugated metal roofs, log houses, and A-frame houses, exclusion is extremely difficult or costly. It may be more realistic to exclude bats from a certain portion of the building and let them remain in another section. How 'tight' is the building? Are there lots of cracks and crevices allowing entrance to the building space or just a few?

Timing an Eviction

The timing of eviction is critical to ensure that bats are not inadvertently trapped inside the roost structure. Evictions and **exclusions are not permitted during the maternity season from May 1 to September 1** (See Calendar below). Bat pups (young-of-the-year) are generally born in early- to mid-summer, following a roughly two-month gestation period. Pups nurse for about four weeks, or until they begin flying. Young bats may not be weaned and able to feed on their own until mid- to late-summer. Bat pups cannot fly and are left behind in the roost while their mother forages for insects. Attempts to evict or exclude bats while they are still using the roost can result in the death of flightless young, as well as an increase in the number of adult bats and orphaned pups that enter the living space, potentially heightening the risk of human-bat contact and, rarely, rabies exposure.

Even when pups can fly, they may continue to use the roost as a safe place to spend their days so sealing the roost before September 1st (even after waiting for bats to fly out at night) can trap bats inside. This method is not only a contravention of the BC Wildlife Act, but may also cause homeowners considerable grief. The trapped bats may attempt to find a new way out of the roost, following wiring and piping ports. Some meet dead ends until they finally die of dehydration and the carcasses are trapped within the walls or floors. Insect infestations and foul odors may result from the decomposition of trapped bats. Others find their way into the living quarters and then fly around searching for a way out. Neither scenario is welcomed by homeowners.

EXCLUSION GUIDELINES FOR BATS IN BC

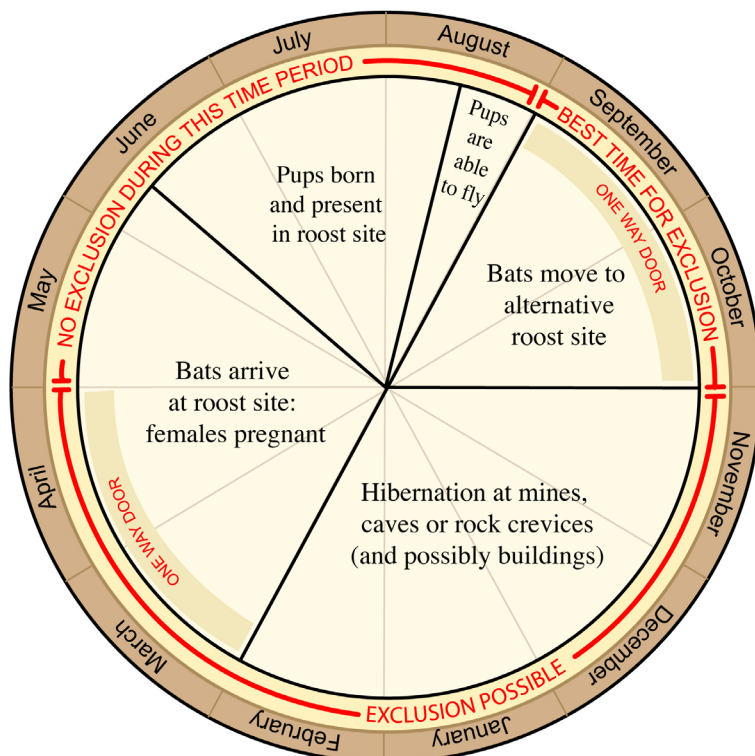


FIGURE 3. CALENDAR FOR TIMING OF EXCLUDING BATS FROM STRUCTURES IN BC.

Under the BC Wildlife Act it is illegal to physically remove bats. And since bats can travel many kilometres in a night, they would likely find their way back to the roost site again. Evictions and exclusions are not permitted during the maternity season from May 1 to September 1. Ideally evictions should take place in fall (September 1 to November 1).

Option 3: Enhance Bat Habitat



Photo by Katie Bell

INSTALLATION OF A BAT HOUSE ON THE SIDE OF THE BUILDING PRIOR TO SEALING THE ROOST.

There are many bat species that are of conservation concern in BC. Landowners with bats on their property can play an important role in stewardship of these important animals. Enhancing bat habitat should be considered if:

- Bats are not a concern or issues can be adequately addressed
- An important colony of a species at risk has been identified
- Landowners have an interest in environmental stewardship
- Landowners would like increased insect control or other benefits of a healthy bat colony

Bat roosting habitat may be enhanced within an existing roost site or by adding features to the property.

Within roost site:

Enhance crevices

Bat species that roost in buildings in BC, with the exception of Townsend's Big-Eared Bats, prefer small (approx. 1") crevices. Increasing the number of crevices will provide increased roosting habitat. For example, attaching plywood over rafters (to create a gap between the two) will provide additional crevice space.

Enhance grip

Bats require a rough surface in order to easily land and hang in roost structures. Roughening surfaces where bats could potentially roost may allow access to spaces that were previously unusable. For example, where plywood is slick, roughen the surface with sandpaper or by cutting grooves.

Increase darkness

Some roost sites become unsuitable when too much light is present. Increasing darkness may create a more favorable site. Fixing roofs that are in disrepair, screening or blocking windows, or creating smaller "rooms" within an attic of a house, barn or shed may create darker roost areas. Sectioning the attic to reduce daylight. Keeping the gable ends partially open is extremely effective in attracting bats, particularly Townsend's Big-Eared Bats, into outbuildings as they seem to prefer a large access opening.

Option 3: Enhance Bat Habitat

Outside the Building:

Bat houses

A bat house is another way to enhance habitat for bats in your backyard. A bat house is a human-made structure designed to provide bats with a warm, dry and safe roost site. Similar to birdhouses, they are often wooden “boxes” that can be installed in a garden, on a building, on a tall post in an agricultural field, or in other openings. Some people install bat houses in coordination with evicting bats from a building so that the bats will have an alternative roost site and the eviction will be more successful.

There are several designs of bat houses that are effective in BC. Most bat houses have one to four roosting chambers. Multiple chambered bat houses not only provide added roosting space but also give bats the opportunity to select an appropriate temperature by moving between chambers, and they are generally more successful than single-chambered designs. For more information on bat houses, see the document “Building Homes for Bats: A Guide for Bat houses in British Columbia” (available at www.bcbats.ca).

Backyard Biodiversity

Bat habitat can be enhanced in the backyard by maintaining or increasing rock features, trees, other plant species, and water features. Generally, bats prefer tall, old, dead, large diameter trees with peeling bark, cracks and crevices. Managing tree roosts usually entails trying to balance the needs of bats with the safety of humans. Rock features, such as cliffs and crevices, also support bats, particularly if they face south. Bats use aquatic features such as wetlands, ponds, channels, and rivers for drinking and foraging. Drinking habitat consists of any water body, small or large, with clean water, open space above and open flight path to access the water surface since bats drink while flying. Algae and floating plants such as duckweed reduce the suitability of a pond as a drinking water source for bats. Water troughs, such as those used by livestock, should be provided with a stick or ramp that extends into the water so bats have a way to climb out if they accidentally drop into the water.



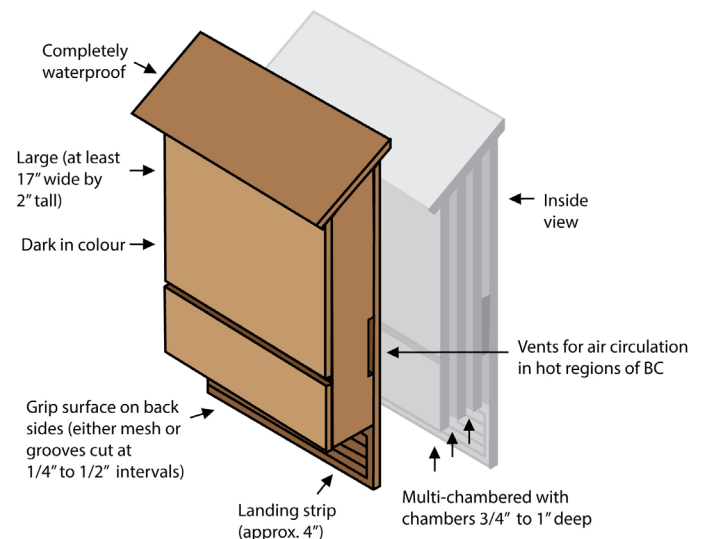
Photo by Juliet Craig

ROCKET BOX ON POLE (TOP); FOUR-CHAMBER NURSERY BAT HOUSE INSTALLED ON SIDE OF BUILDING (BOTTOM).



Photo by Juliet Craig

KEY FEATURES OF A BAT HOUSE



Promote Bat Conservation



There are several activities that homeowners can do to support bat conservation.

- Contact your local community bat program to try to identify your bat species.
- Participate in the Annual Bat Count to monitor bat populations on your property.
- “Like” the BC Community Bat Program on Facebook.
- Contact your community bat program for more information on how to get involved in local bat conservation projects and introduce some of your own ideas.

For more information, see www.bcbats.ca

RESOURCES

BC Bat Information

- BC Community Bat Program Network (www.bcbats.ca) including:
 - “Got Bats? 7 Steps for Excluding Bats from Buildings in BC”
 - “Building Homes for Bats: A Guide for Bat houses in BC “ (includes links to bat house designs and description of best designs and locations for placement)

Removing a single bat from the living space

- Bat Conservation International
 - <http://www.batcon.org/index.php/resources/for-specific-issues/bats-in-buildings/there-s-a-bat-in-my-house>
 - Video: http://www.youtube.com/watch?v=mzax0V0DG_M

Information about White-nose Syndrome

- BC Wildlife Health Program: www.gov.bc.ca/wildlifehealth
- Canadian Wildlife Health Cooperative: http://www.cwhc-rcsf.ca/wns_regional_outlook.php
- US White-nose Syndrome website: <http://whitenosesyndrome.org>

Rabies and other health concerns

- BC Centre for Disease Control
 - http://www.bccdc.ca/dis-cond/a-z/_r/Rabies/overview/Rabies.htm



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