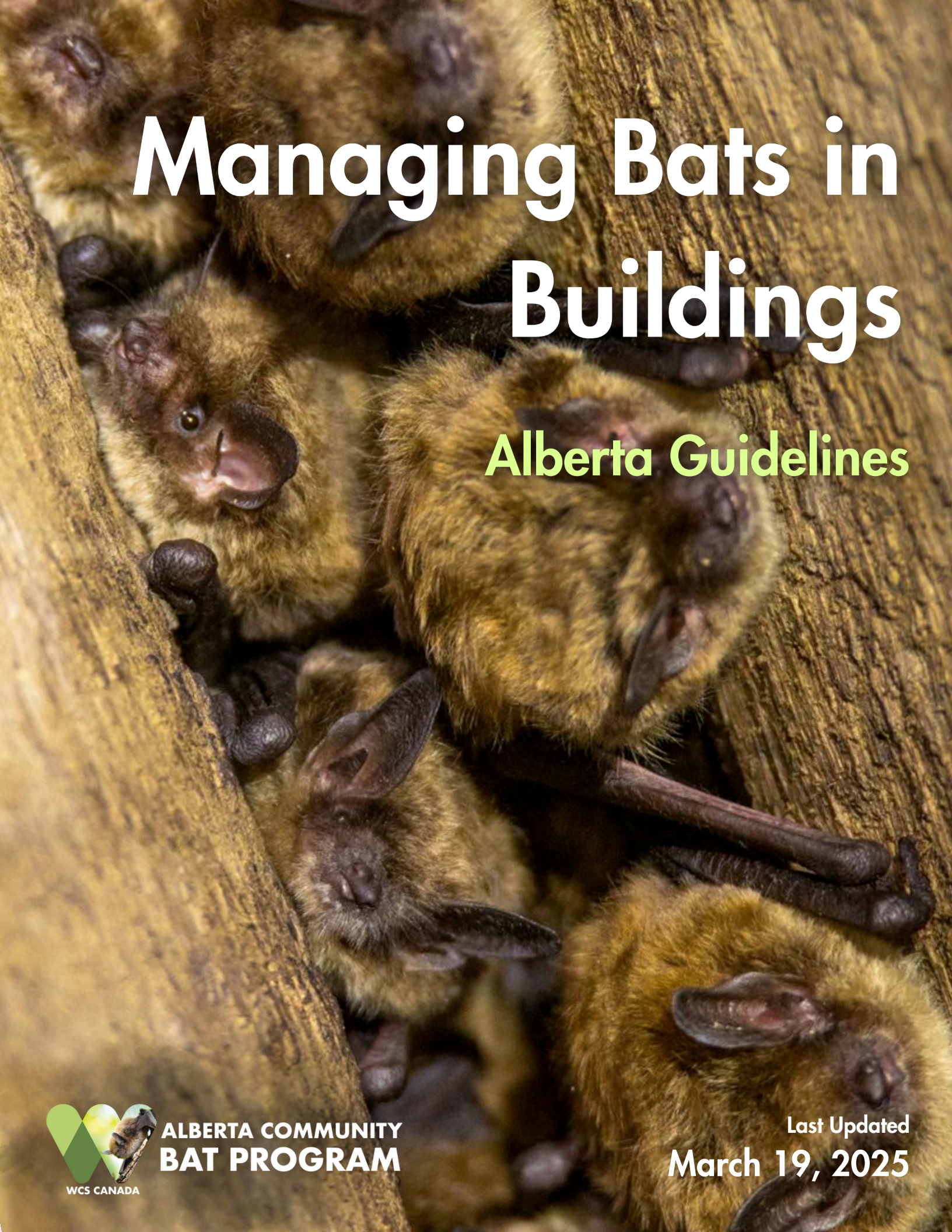
Managing Bats in Buildings

Alberta Guidelines



ALBERTA COMMUNITY BAT PROGRAM

WCS CANADA

Last Updated

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Acknowledgements

This guidebook was updated in 2025 to incorporate new information on bat management that has arisen because of work done by the Alberta Community Bat Program—and others—and to align with the new "Best Management Practices for the Use of Bat Houses in US and Canada" (https://wcscanada.org/resources/summary-best-management-practices-for-bat-houses-in-the-usa-and-canada/). This guidebook was originally adapted, with permission, from "Got Bats? A BC Guide for Managing Bats in Buildings", prepared by the BC Community Bat Program (www.bcbats.ca, authors Juliet Craig and Mike Sarell). The original and updated version of this Alberta guidebook was written and adapted by Cory Olson and Susan Holroyd, and where applicable, retained content from the original version created for BC. We thank Cori Lausen, Lisa Wilkinson, Erin Low, and Jody Rintoul for reviewing this or earlier versions of the document. We also thank those who contributed to the development of the original guide in BC. Alberta content was developed by WCS Canada in collaboration with Alberta Environment and Parks. The generous support of project partners, granting agencies, and volunteers was integral to the development of this guide and the success of the Alberta Community Bat Program.

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Cover Photo: Little Brown Myotis Materity Colony by Jason Headley

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This guide will be periodically updated. Visit www.albertabats.ca/resources for the latest version. Please contact the Alberta Community Bat Program if you have identified errors or have other comments.

Why help building roosting bats?

Bats are an important part of Alberta's biodiversity. Protecting them is not only the right thing to do, but will also help support our economy, human health, and the ecosystems upon which we depend. One of the most direct impacts people have on bats is how they manage the buildings where bats roost. Large building colonies support bats that feed many kilometres away, meaning their loss would have wide-reaching repercussions for the environment.

Bats are among the top predators of night-flying insects and are important for maintaining healthy ecosystems. Many pests of forests, crops, and people are among the favourite foods of bats. Their organic control of these pests is worth billions of dollars annually to the North American economy and is important for protecting human health.

Bats are unique among small mammals and aspects of their life-history make them a high conservation concern. Unlike rodents, bats reproduce slowly and live long lives. Building roosting bats give birth to just one pup per year, and may not reproduce at all during poor years. Unfortunately, human activities have introduced new threats that are negatively affecting bat populations. Among the most serious of these is white-nose syndrome, a fungal disease that has already killed millions of bats in North America and is now confirmed to be in Alberta. Many bats are also being lost because of wind turbines, climate change, insect declines, habitat loss, and extermination.

Protecting roosting habitat is crucial for supporting bat conservation. For some species, buildings provide important habitats for raising young—especially in highly developed areas where natural roosting sites are scarce. Some species, like the endangered Little Brown Myotis, rely on building roosts, and poor management of even one roost can cause major harm to their population.

While many people welcome bats on their property, issues with noise, smell, and guano buildup can become significant concerns. These problems often arise when colonies are left unattended for years, allowing guano to accumulate. Regular inspection, cleaning, and maintenance can prevent such issues. Thankfully, bats do not build nests and they do not chew through insulation or wiring. With simple adjustments and upkeep, bats can coexist in our communities with minimal impact on human occupants.

Little Brown Myotis, Jason Headley

If building owners decide bats cannot stay, timing is crucial for exclusions and repairs. In Alberta, most bats only use buildings in summer, though Big Brown Bats may stay through winter. Waiting until bats leave naturally is not only the best option for bats, it is often the safest, cheapest, and most effective method available. Bats are also protected wildlife in Alberta, which makes it illegal to deliberately harm them in most circumstances.

Simple changes can support bats. Removing hazards, planting native vegetation, providing well-designed bat houses, modifying unused buildings for bats, or simply finding a way to keep bats in buildings can benefit local bat populations.

What's in this guide?

- Background
- Bats and People
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Background

Combating misinformation with some "bat facts"

Bats are not rodents and not pests. All bats are now protected under the Alberta Wildlife Act, and disturbance or harm is prohibited under provincial and federal laws. Extermination is not an appropriate management tool.

Bats live long lives but reproduce slowly, with most species in Alberta having just one pup per year, starting in their second or third year. This slow reproduction makes it hard for bat populations to recover if a colony is lost.

Bats do not hibernate in bat houses and only one species **might** overwinter in a building (Big Brown Bat). Of the nine Alberta bat species, three leave Alberta for the winter, while the other six hibernate in the province or a neighbouring jurisdiction (likely in caves, mines or deep rock crevices).

Unlike rodents, bats do not build nests and they do not chew or claw their way into a structure—there is no such thing as a bat nest. Instead, they take advantage of small openings or areas of disrepair on the outside of a building.

Bats in Canada only eat insects (and sometimes spiders). Diet studies have found that bats eat pest insects that impact agricultural and forestry resources, as well as disease-spreading pests such as mosquitoes.

Bats are the only true flying mammals. They hang upside down to allow them to drop head first to take flight quickly. Unlike birds, many bats have difficulty taking off from the ground to gain flight.

White-nose syndrome (WNS) is a fungal disease that has killed millions of bats in North America since 2006. Decontamination procedures are essential year-round due to fungal spores in bat droppings. The disease is unevenly distributed over landscapes, and slowing its spread could help protect uninfected bat populations.

Over half of Alberta's nine bat species are a conservation concern. The Little Brown Myotis and Northern Myotis are listed as Endangered both provincially and nationally because of high levels of mortality caused by white-nose syndrome. Our three migratory bats (Hoary Bats, Eastern Red Bat, and Silver-haired Bat) have been assessed as endangered in Canada because of fatalities at wind turbines. All bats are experiencing habitat loss.

Did you know?

During the summer, a bat may eat more than its weight in insects during a single night of feeding. A large building colony may eat millions of mosquito-sized insects per night.

One bat in Alberta was known to be at least 39 years old the last time it was seen. They have long lives but few babies with most bats only birthing one pup each year. This image shows a nursing Little Brown Myotis pup. Mother bats can carry pups until they are able to fly on their own.

Visit the Alberta Community Bat Program website for free resources, including:

- *Information on bat houses*
- *Blueprints for building your own bat house*
- *Guides for building bat-friendly communities*
- *Information on human health concerns*
- *What to do if you find a dead or injured bat*

Never handle living or dead bats with your bare hands. If a bat must be moved, wear thick leather gloves and use another object, such as a pillow case,towel or box, to gently move the bat. If the bat must be temporarily contained prior to release, ensure the box or bag is tightly closed to ensure the bat will not escape once it becomes active.

*Bats do not seek out and attack people, but will bite when handled or accidentally touched. Bites require immediate medical attention. When left alone, bats are not a threat to people. If you must move a bat, be sure to wear thick **leather gloves** to protect from bites. Nitrile, latex or rubber gloves will not protect you from a bat bite.*

Visit the provincial wildlife disease webpage for more information on wildlife health concerns in Alberta

Realistically Assessing Rabies Risk

Rabies is easily prevented by **not touching bats**.

Millions of bats live near people and help control insect pests. Most stay out of sight and pose no risk, but taking simple precautions can keep both you and the bats safe.

Never touch bats with your bare hands. Like many wild animals, bats will defend themselves by biting if they feel threatened, such as when someone attempts to pick them up or reaches into a place where they are hiding. Although very rare, there is potential to contract rabies from a bat bite, or from a scratch on the skin from contact with a tooth. Rabies is rare—well below 1% of free-flying bats have rabies. However, we know the virus occurs throughout the province and that sick bats are more likely to be found by people.

Post-exposure shots must be administered as soon as possible after any exposure, or suspected exposure, because once rabies symptoms appear, the virus is almost always fatal.

Bites typically do not leave visible puncture wounds and rarely bleed, so it may be difficult to determine if someone was bitten—if in doubt, always seek medical treatment. This includes situations where a bat was found in an area people were sleeping or kids were playing. Rabies can also be prevented through vaccinations delivered prior to exposure, but regular testing is needed to ensure continued immunity.

The best prevention is to never handle bats with bare hands.
Bats do not seek out and attack people. Exposure is typically through accidental contact or deliberate handling of bats. Bats should not be allowed to enter the living quarters of a home, although they can quite often safely use portions of a building where human contact will not occur. Pets should always have up-to-date rabies vaccinations. Nitrile, latex, or rubber gloves are not adequate to protect against bites—leather puncture resistant gloves must be worn. Professionals handing bats often wear disposable nitrile gloves overtop their leather gloves to help prevent the spread of pathogens among bats.

Have you or your pet been bitten?

If you come into contact with a bat in Alberta, contact the Provincial Rabies Hotline at 1-844-427-6847 for assessment and instructions for receiving treatment (alternatively, contact Health Link at 811). It is important you receive prompt medical attention from a doctor or nurse, even if you are unsure whether you were bitten. Treatment will typically consist of post-exposure prophylaxis, a series of shots that helps your immune system destroy the virus during its early stages. These shots are small injections in the muscle of the arm or leg, much like other vaccinations we commonly receive. Check with your veterinarian to ensure your pet's vaccinations are up-to-date.

Bats and People

Bat guano and urine

Bat guano and urine are typically not health hazards. However, in rare cases, bat or bird feces have been associated with a fungal disease known as histoplasmosis. This disease has only been detected a few times in Alberta, and the risk is likely low in most areas of the province. However, beware that bats are often in areas where other health concerns, such as hanta virus (from exposure to the urine/feces of some rodents), dust, mould, and asbestos may also be an issue.

Histoplasmosis is a lung disease caused by the inhalation of the fungal spores of *Histoplasma capsulatum*, which grows in humid conditions in areas with high concentrations of bat or bird droppings. Once the fungus dries, it can be inhaled, and people who inhale the spores may become sick. Most people recover on their own, and may not even be aware they were exposed. More serious health consequences may occur in some situations, especially for those with weak immune systems.

Appropriate respiratory protection, gloves, and coveralls should be worn if disturbing the feces of any wild animal, especially in confined areas such as attics. Lightly wetting an area prior to cleaning (e.g., by using a spray bottle containing a 10% bleach solution) will help reduce the amount of dust generated. Respiratory protection should include at least an N-100 (high-efficiency) respirator for protection from histoplasmosis. **However, buildings with bats are often old and may have other health risks that require additional precautions, such as to prevent exposure to asbestos and rodent-associated diseases** (note that an N-100 respirator does not provide adequate protection from asbestos). Professional services may be needed for high-risk situations.

Have you found a dead bat?

Do not touch bats, dead or alive. Bats may go into a state of 'torpor' (similar to winter hibernation) which involves lowering their body temperature so that they can conserve energy. Bats will be cold and immobile and they may appear dead. However, they will become active once they rewarm their body and may still bite.

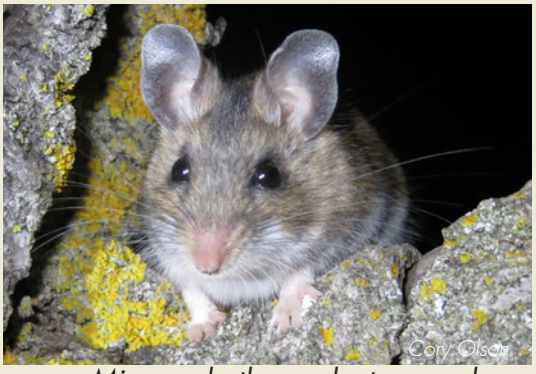
Dead bat laying in the grass.

Submitting Dead Bats

In some cases, bat carcasses may be accepted by a Fish & Wildlife Office for inclusion in their routine disease monitoring program. Call the Alberta Environment and Parks information line at 1-877-944-0313 to locate your nearest office or visit their webpage.

Guano is often found on insulation and other surfaces in attics where bats are roosting. Clean up may require protective measures (e.g., masks and gloves) at some sites.

Vermiculite used to insulate homes has potential to contain asbestos fibres (a potentially harmful material). Be careful not to disturb this material when cleaning; professional services may be required to prevent exposure.



Mice and other rodents may share buildings with bats. Hantavirus may be passed through the droppings of deer mice (shown above), requiring special health precautions during clean up.

Distressed Bats and Rehabilitation

Visit the Alberta Community Bat Program Website for a listing of wildlife rehabilitation centres that accept bats.

A pillow case can be a useful tool to pick up and contain bats prior to release (leather gloves must also be worn). The pillow case can be used like a glove to gently grab the bat and then inverted (and tightly tied) for containment. To release the bat, the pillow case can be tacked, open side up, to the side of a tree (at least 2 metres high to avoid predators). A healthy bat will likely wait until after sunset and then fly away. Bats can bite through fabric, so always wear leather gloves for protection, and make sure the bat is placed in a location where contact with people or pets will not occur.

www.albertabats.ca/foundabat

Have you found an injured or distressed bat?

Encounters with bats are most often reported during the late summer and fall, when young bats are learning to fly or large numbers of bats are undergoing long-distance movements to their winter habitat. During this period, bats may be found in highly unusual locations, such as the sides of building and under patio umbrellas. **In most of these cases, the best option is to leave the bat alone—it may simply be resting until it can take off again the following night.**

If the bat is on the ground, or in an inappropriate location, it may need to be moved. If the bat does not look sick or injured, it may be placed in an elevated location where it can take off into open flight space and where it won't come in contact with people or predators (especially magpies and cats). Suitable locations may include a decaying tree that can provide hiding spaces for bats (e.g., sloughing bark, cavities, holes, cracks, and breakage). Thick leather gloves should always be worn when moving a bat. Choose a location near a clearing so the bat doesn't crash once it attempts to fly. The bat will most likely seek shelter and rest until dark. If the bat is still there the following day, you may wish to contact a rehabilitation centre (see the Alberta Community Bat Program for a listing).

Bats exhibiting unusual behaviour, such as flying during the day or lying on the ground, are more likely to be sick (possibly with rabies) and should be treated with care. On hot days, bats flying during the day may simply be getting water and are otherwise healthy. As a precaution, avoid the area where the bat is located and keep pets inside. If necessary, put on gloves, and use a stick, spade, or pillow-case to gently move the bat into an area away from humans and pets.

"contain" "call" "coordinate"
(with a wildlife rehabilitator)

If you are confident the bat is injured or distressed, contact your local wildlife rehabilitation centre for advice and assistance. Remember to always use safe procedures when handling bats and wear thick leather gloves. Place the bat inside a cardboard box with SMALL air holes and ensure the box is tightly closed. Bats cannot chew through fabric or cardboard, but they are fantastic at finding their way out of loosely closed bags or boxes. Other than to deliver a bat to a wildlife rehabilitation centre or veterinarian, keeping bats in captivity is not recommended or legal—it requires appropriate permits, and is typically unsuccessful without extensive experience and knowledge of animal care. The best option is to leave the bat alone or to contact a wildlife rehabilitation centre.

Bats in Buildings

Buildings and other human-made structures can offer warm, safe shelters for some bat species. Often the warm and dry conditions of buildings make them particularly suitable for female bats to birth and raise their offspring. In addition, buildings can serve as temporary night roosts (places they rest between night time foraging bouts) and migratory stop-overs. Buildings have become an important resource for some bat species, especially in locations where natural roosting habitat has been lost. Most bats that use buildings would roost in trees in the absence of human structures—especially large trees with cracks, crevices, and sloughing bark in which bats can hide. However, in developed regions of the province, these trees are often cut down before suitable roost features develop, making buildings the best available roosting habitat. Although buildings can provide optimal conditions for roosting, bats occupying them are more vulnerable to human disturbance or injury, either by intentional or accidental means.

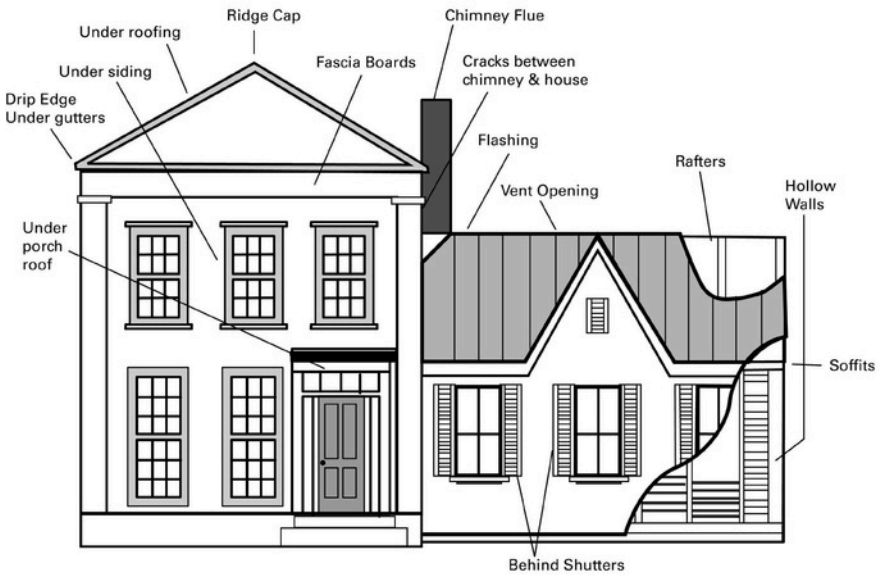


DIAGRAM OF A HOUSE SHOWING POSSIBLE ROOST SITES FOR BATS[1]

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. They often occupy tight crevices, and can squeeze into spaces with a diameter as small as 0.5" (1.3 cm). Bats don't chew to alter their environment like rodents do, and so they must rely on existing holes or gaps to gain entry. Conducting regular maintenance on a home will help prevent issues with bats. The spring is a good time to look for maintenance issues caused by frost heaving. Sometimes bats appear to be roosting inside a house when in fact they are simply hiding in an exterior crevice or under some loose trim and may not cause a problem for the homeowner.

Did you know?

Bats do not chew holes to access buildings and they do not build nests. They are entirely reliant on pre-existing openings to gain entry. Good building practices and regular maintenance can prevent most conflicts homeowners have with bats.

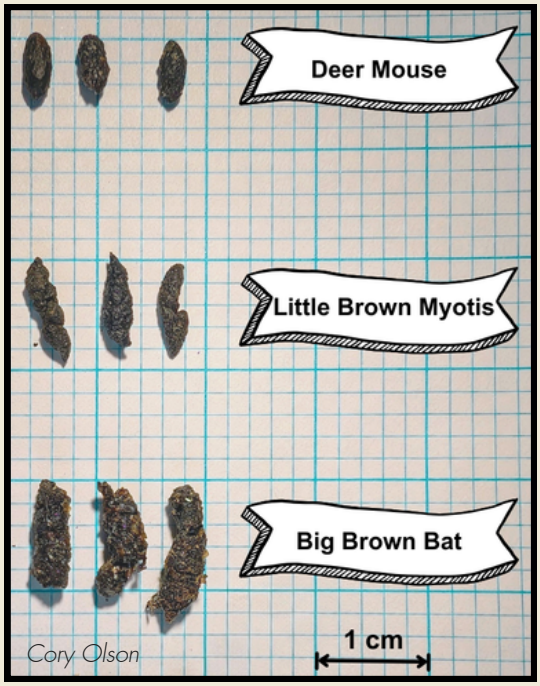
Little Brown Myotis (Myotis lucifugus) maternity roost in a picnic shelter.

[1] Diagram prepared by Julianne Leekie for the Kootenay Community Bat Project, based on original drawing by Dr. Stephen C. Frantz, Global Environmental Options, LLC.

Which Bats Use Buildings?

Bat or mouse droppings?

Bat guano and mouse feces looks similar. However, when gently pressed, bat guano will readily crumble, while mouse feces will usually hold its shape. Bat guano will often be in places where mice cannot reach (like stuck to walls) and will often accumulate in piles on the ground below their roosts.



Comparison of fecal pellet size for common building occupants.

Big Brown Bat (Eptesicus fuscus)

Alberta Bats in Buildings

Most bats occupying building roosts in Alberta are either Little Brown Myotis or Big Brown Bats. Long-legged Myotis, Long-eared Myotis, and Silver-haired Bats may also use buildings but are rarely reported, possibly because they tend to roost in smaller groups and go unnoticed.

Identifying Species

Bats are difficult to tell apart without close examination and extensive training. Even experts can have difficulty with some species groups. Recent genetic techniques allow bats to be identified to species from a sample of guano (bat feces). The Alberta Community Bat Program may be able to assist with species identification using guano samples. See the web page or contact the program directly for more details.

Big Brown Bats can be separated from the smaller bats of the genus Myotis (e.g., Little Brown Myotis) based on the size of their fecal pellets. The adjacent image may be used as a guide. Bat guano looks superficially like rodent feces, but consists only of digested insects and is often deposited in different locations.

Puffy bare cheeks!

Typical of Big Brown Bats.

Big Brown Bat

The Big Brown Bat (*Eptesicus fuscus*) is one of Alberta's larger bat species, weighing 15-20 g. The species is common throughout most of Alberta, but is uncommon in some regions of the Boreal. This species often roosts in buildings, trees, rock crevices, caves, and mines, with colonies typically under 100 individuals. Some hibernate in deep rock crevices and erosion holes of prairie river valleys, and they are the only Alberta bat species known to occasionally hibernate in buildings. They can be detected flying during warm winter nights along prairie river valleys in human communities, near where they hibernate. Big Brown Bats are identifiable by their broad heads, puffy noses, and pale fur (some may be darker brown). Their strong jaws are well suited for eating beetles, but they also feed on flies, moths, mayflies, caddisflies, and other insects.

Which Bats Use Buildings?

Little Brown Myotis

Little Brown Myotis (*Myotis lucifugus*), or Little Brown Bat, are common across Alberta. Weighing 7-10 grams, this medium-sized bat has brown fur, though some in southern Alberta may be paler. They roost in buildings, old trees, rock crevices, caves, mines, bridges, and bat houses, with colony sizes ranging from a few bats to over a thousand. Little Browns are smaller than Big Brown Bats and their faces lack the swollen, bare puffy cheeks (their noses tend to be more furred and pointy). Their diet includes aquatic insects like midges, caddisflies, and mayflies, as well as beetles, moths, mosquitoes, spiders, and other small insects. Often found in cottages near water, they are both provincially and federally listed as Endangered in Canada due to the impact of white-nose syndrome on their populations. This species is the most common type of bat to use bat houses and buildings in Alberta.

Little Brown Myotis (Myotis lucifugus)

Long-legged Myotis

Long-legged Myotis (*Myotis volans*) are approximately the same size as the Little Brown Myotis and have a similar physical appearance. They may roost in mixed groups with Little Brown Myotis, and may be overlooked in many regions. Recent advances in DNA testing now make it possible to increase the number of reports for this species, but their use of buildings is still poorly understood. Multiple building roosts have been reported in the Rocky Mountains and foothills, suggesting the use of buildings may occur in some areas. The typical size of colonies is unknown in Alberta. Long-legged Myotis appear somewhat less associated with aquatic habitats than Little Brown Myotis, although both are widespread in areas they occur.

Long-Legged Myotis (Myotis volans)

Long-eared Myotis

Long-eared Myotis (*Myotis evotis*) are slightly smaller than Little Brown Myotis, but have substantially longer ears. They are highly manoeuvrable, capable of accessing difficult-to-reach roosts, and can easily glean insects from the surfaces of vegetation. They often roost in rock crevices, but also roost in trees (including stumps), wood piles, and buildings. The species is not commonly reported, which may reflect their tendency to roost alone or in small groups, where they go unnoticed. Reports of this species using buildings occurs much less often than for Little Brown Myotis, but may be a regular occurrence in some areas, such as the Rocky Mountains and near prairie rivers.

Long-eared Myotis (Myotis evotis)

Types of Bat Roosts

Viewing a nursery bat house (maternity colony). Looking up from the bottom.

A night roost along the siding and under the eaves of a shower building in Alberta. Bats depart by morning, but their presence is given away by the guano and urine staining left behind.

> *Many bats use the sides and overhangs of buildings as night roosts, and may never enter the building. Homeowners generally experience few problems with night roosts.*

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 and their offspring (maternity roost). Usually these roost sites are enclosed spaces where they are protected from inclement weather and predators. Occasionally a bat will roost in the open (such as under the eaves of a building), especially during the fall when bats are migrating. Some day roosts are used intermittently for a few nights, while others may be used continuously.

Maternity Roosts

Maternity roosts are locations where multiple females gather to raise pups and may be used as both day and night roosts. Each female bat typically has only one pup per year but may roost in groups consisting of up to a thousand or more individuals. In most situations, large groups of bats seen in Alberta during the summer months are maternity colonies. Roosts may be reused over several years or decades. Numbers may remain stable during the summer months or may fluctuate substantially from night-to-night. Maternity roosts are usually easy to detect because large numbers of bats will tend to produce audible noise (squeaking), produce odour, and guano (feces) will accumulate on surfaces around access points. Common locations include attics, barns, sheds, siding, and other enclosed spaces. Protection and appropriate management 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.

Night Roosts

Night roosts are places that bats use during the night to rest between feeding bouts. These are often in open spaces, such as under bridges, archways above doors, covered patios, and garages. Residents rarely see bats at night roosts but instead observe droppings, and possibly discarded insect parts, each morning where the bats were roosting the night before. The primary nuisance with night roosts is cleaning up the guano—health risks are usually minor, but see Bats and People. Cleaning can be made easier by placing a plant pot, shelf or gutter below their roosting location to collect the guano before it falls to the floor. The presence of a night roost does not necessarily indicate that bats are inside the building, and exclusion is typically not required. However, if night-roosting bat are unwelcome, their continued presence can be discouraged by installing smooth materials (e.g., plexiglass or smooth plastic) in places they are hanging to prevent them from gripping the surface. Modifying night roosts should only be done once bats are absent.

Signs That You Have Bats

Signs of Bats Occupying a Building

- **You see bats.**
- **You hear bats.**
- **You see bat poop.**
- **You see staining (urine or rub marks) at spots where bats are entering and exiting.**
- **You can smell bats (musty, earthy smell)**

Finding a single bat inside your home may be the result of a bat accidentally entering through an open door or window. Not every bat you see is an indication that you have a colony in your home. The photo above, however, shows a single bat and brown staining on the white roof structure where bats have been accessing an interior space. This is a good indication that a larger colony may be present.

Bat poop (guano) can accumulate over many years at some sites. These piles are obvious signs of bat use. Bat guano is not always this obvious, so be sure to carefully examine walls, window surfaces and floors directly beneath potential roosting spots for any stray guano pellets. Crush pellets to determine if they are from a bat or a mouse. Mouse feces is hard and clay-like; bat guano will crush into a rough powder of chewed insect bits (see image on Page 9). Bat guano has a musty, earthy smell and together with urine may have a slight ammonia scent. Discerning noses may quickly identify the smell of bats if they are present.

A colony of bats in an attic, tucked up against the rafters and the roof peak.

Bat Guano

7:1 Enlargement

Actual size

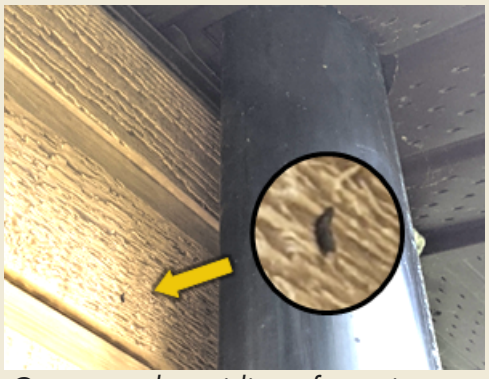
Bats in Canada only eat bugs (insects & spiders), and their guano consists of the leftover exoskeletons of past meals. Also see panel diagram, Page 9.

Homeowners often hear noises in attics and walls that give the first indication that there are bats present. Bats entering the home may also be an indication of a colony (but not always). Listen for bat noises in this short video from our Alberta Bats YouTube channel.

Signs That You Have Bats

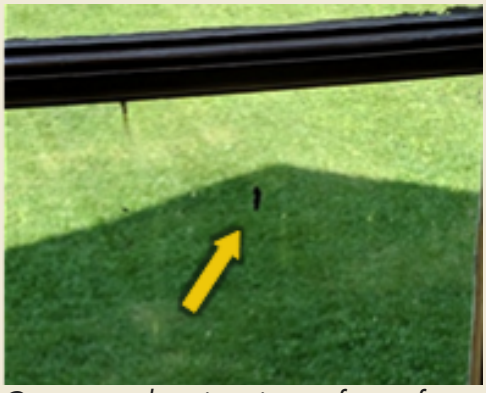
Identifying locations where guano is present provides the best clue of whether bats are present and how they may be accessing a building. Minor guano on the exterior of a building does not necessarily indicate a colony is present, but is evidence that bats are present in the area. Below are some common areas where guano may be found when bats are present.

Guano laying on insulation of attic floor.



Guano stuck to siding of exterior wall near rain spout.

Guano stuck to the exterior surface of a door.



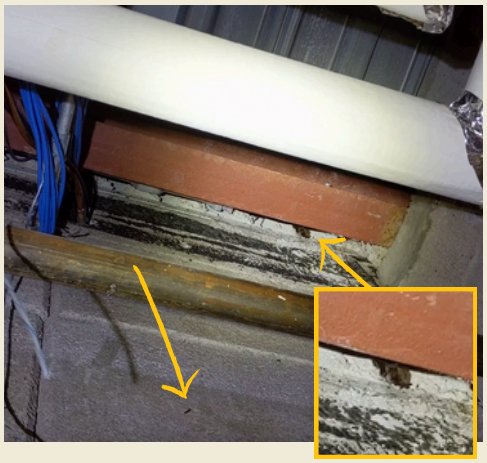
Guano stuck to interior surface of window.

Guano laying on sidewalk below roosting location under the eaves.

Guano laying on ground below the ridge line of an old granary where a large maternity colony roosted.

A gap between the wall and the soffits, along the roof edge, used by bats to access the attic. There is brownish staining from the oils of the bat's fur repeatedly rubbing off onto the surface during entry.

Guano on (and at base of) a cinder block chimney.



Guano and a visible bat in the utility room of a commercial building; roosting on a cinder block wall.

Photos by Cory Olson unless noted otherwise

Making a Plan

Information for Property Owners

First steps

- **Stay Calm:** Bats in a building are not an emergency. Avoid touching bats with bare hands, and ensure pets are vaccinated for rabies. Take a moment to assess the situation.
- **Confirm Presence:** Verify if bats are inside the building. Observe your home, identify access points, and follow the roost counting protocols at albertabats.ca/communityscience.
- **Determine Roost Type:** Check if bats are temporarily roosting outside, using the area as a night roost, or if they accidentally entered the home. Or do you have a maternity colony?
- **Secure Living Spaces:** If there's a maternity colony inside, seal off access to the human living spaces. This can often be done yourself at any time of year.
- **Plan Your Next Steps:** Exclusions can be costly, so prepare carefully. Watch the bats' activity, document access points, and count the colony size. Wait until the colony disperses before starting exclusion work (see Calendar on Page 24). Plan your exclusion, including timing, desired outcomes, and follow-up expectations.

Who You Gonna Call?

If you discover a bat colony in your home, decide whether you'll handle the situation yourself or hire help:

- **Doing It Yourself:** Follow the tips in this guide for safe, humane management, paying close attention to timing and safety.
- **Hiring a Professional:** Ensure the person you hire uses bat-friendly methods. Share this guide with them to promote humane practices. Ask if they have completed our online course "Managing Bats in Buildings" (https://training.canadabats.org).

Some Pest Control Operators and Structural Wildlife Control Operators are knowledgeable about bats, but others may lack basic bat biology knowledge. Historical methods of bat removal are now widely seen as unacceptable. Stay informed, ask questions, and make it clear that you expect humane, bat-friendly management.

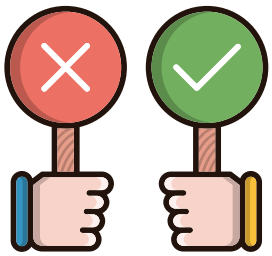
Information on bats and health risks should be obtained from reliable sources—such as academic literature and government bulletins. Pest control websites often exaggerate danger and provide misleading or incorrect information. For example, diseases such as ebola, nipah, and hendra viruses are not associated with North American bats. Bats also do not create nests and do not chew holes through insulation or wiring.

Cimicid bat bugs (shown above) are common parasites of bats. Bat bugs in Alberta are related to the bed bug (Cimex lectularius) but are a different species—they are not bed bugs. Bat bugs may occasionally migrate into the living quarters of homes that bats have inhabited, especially after bats have been evicted. These parasites are not known to be a health risk to people; bat bugs biting people have been purported but not verified. The application of insecticides to kill bat parasites may comfort nerves, but may not be warranted if their access into living quarters can be prevented. In the absence of bats, the bat bug (along with fleas and mites that also feed on bats) will eventually die out on their own.

Methods that include poisoning, trapping (e.g. cages, sticky traps), exterminating, moving, or in any other way harming, harassing, or killing bats should never be used.

Sticky traps can be deadly to bats. Avoid using them or ensure they're inaccessible by adding covers or cages.

Spray foam can be a great product to fill gaps - but avoid using it when bats are present. Bats stuck in foam require medical care to get them safely "unstuck".



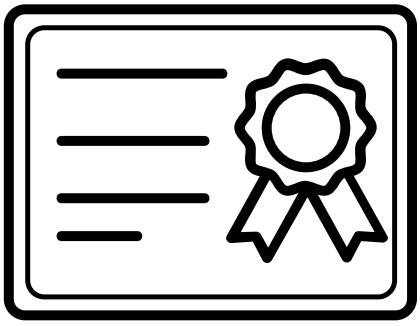
Setting the Ground Rules for a Bat-friendly Exclusion

- **Avoid Capturing or Removing Bats:** If a professional plans to capture and remove bats, it's a red flag they're excluding bats at the wrong time of year. Trapping and caging bats should only occur in emergencies, such as when bats need rescue or removal from living spaces.
- **Unacceptable Methods:** Using shop vacuums, pressurized air, or pressure washers to remove bats is unethical, potentially illegal, and can kill bats or cause injuries like broken wings or trauma-induced abortion in pregnant bats.
- **Do Not Use Sticky Traps:** Sticky traps, even those for bugs or mice, can unintentionally harm bats and should be avoided.
- **No Spray Foam While Bats Are Present:** Never use spray foam or sealants to block exits or fill roost crevices when bats are still in the space.
- **Avoid Moving Reproductive Bats or Pups:** Relocating pregnant or nursing mothers or their young ("translocating") may lead to the death of pups or reproductive failure, either as a direct result of stress and injury, or through delayed development and reduced readiness for hibernation. Relocating bats has unpredictable results, both for the bats being released and for other bats in the receiving community. In some cases, this practice may be illegal. Moreover, bats are likely to return to their original roost if access is not sealed properly. Be cautious of relocation plans.
- **Do Not Use Poisons or Chemicals:** Poisons, chemical deterrents, and pesticides are strongly discouraged. Bats are mammals just like people. Any materials that are toxic to bats will likely be toxic to people. Bat roosts are most often located in the uppermost areas of buildings, which means any pesticides applied may eventually migrate down into the human living spaces. Bats that are weakened from toxic chemicals may also be more prone to illnesses, including rabies.

Bat-friendly Certification

Pest and Structural Wildlife Control Operators can now take an online course on bat-friendly management in buildings, developed by WCS Canada's Alberta Bat Program. Available at canadabats.training.org, this course guides industry professionals on humane practices, supporting both bats and their work.

Pest and Structural Wildlife Control Operators who have completed the course will be issued a dated certificate.



Managing a Bat Colony: Key Guidelines

Timing is Critical (see Calendar, Page 24):

- Wait until bats are absent before taking action.
- Confirm all bats have left the roost before proceeding with cleaning, replacing insulation, or sealing entry/exit points.

Work with Professionals:

- Communicate clearly with your Pest/Wildlife Control Operator, directing them to follow best practices outlined in this guide.
- Collaborate to assess key factors:
  - *Roost Location:* Identify where bats are roosting.
  - *Building Condition:* Consider the building's age and whether it can be fully sealed (old buildings can be challenging).
  - *Alternative Solutions:* Determine if exclusion is necessary or if other options meet your goals (e.g. managing the colony in place).

Exclusion Considerations:

- If exclusion is required:
  - If possible, provide alternative roosting habitats (e.g., bat houses) well in advance of exclusion activities
  - Understand bats may prefer your home over bat houses and are unlikely to voluntarily move.
- Ensure exclusions occur only after bats have left for the year (see "Timing an Eviction or Exclusion").

Expect Multiple Attempts:

- Exclusion may take several tries, potentially over a few years

Information on bats and health risks should be obtained from reliable sources—such as academic literature and government bulletins. Pest control websites often exaggerate danger and provide misleading or incorrect information. For example, diseases such as ebola, nipah, and hendra viruses are not associated with North American bats. Bats also do not create nests and do not chew holes through insulation or wiring.

Spray foam can be useful for preventing access by bats, but should never be used while bats are present. One-way exits are preferred if there is uncertainty whether bats are present inside the roost.

Building condition is an important factor when considering a bat exclusion. Some buildings, because of age or structure, may be almost impossible to seal adequately to prevent bat access without a huge financial investment. These are "porous" buildings. If bat spaces are accessible and can be cleaned to remove accumulated guano, and bats are not entering human living spaces, managing the colony in place may be the cheaper and more appropriate action.

Options for Managing Bats

Bats such as these Long-legged Myotis rely on buildings as sites for raising their offspring. They typically return to the same site each year, potentially for many decades.

> *Capturing and relocating bats is not an appropriate option for managing bats in buildings. Bats are capable of travelling 100's of kilometres to return to their roost, and relocations may contribute to the spread of bat diseases (such as white-nose syndrome) to new areas. Forced eviction may result in reproductive failure and the death of any trapped bats.*

This old granary is a maternity roost used by hundreds of Little Brown Myotis. They are supported by the landowners, who keep the bat's access points open and avoid unnecessary disturbances. Doorways are kept closed to prevent access by predators and to allow the building to stay warm.

Is it Safe for Bats to Stay?

Public perceptions of bats are highly diverse. While some people fear bats as disease carriers, others appreciate their role in controlling pests and protecting crops. These fears are often misplaced—bats are no more dangerous than other wildlife when managed responsibly. The U.S. Centre for Disease Control (CDC) advises that bats in buildings do not need to be evicted if there is minimal risk of human contact (see Bats and People for precautions). Many buildings, especially older ones, serve as essential maternity colonies for bats, offering ideal conditions for raising pups. These spaces allow pups to grow quickly and prepare for winter, which is especially important as diseases like white-nose syndrome threaten bat populations.

Common Issues with Bats in Buildings

Problems with bats in buildings usually arise from their by-products, not the animals themselves. Homeowners may experience:

- Guano: Accumulating in attics, crevices, decks, or porches.
- Noise: Often heard in walls.
- Smell: From urine or permeated insulation.
- Stains: Oils, guano, and urine on walls or surfaces.
- Health concerns: Refer to Bats and People for details.

Managing Bat Issues

In most cases, these concerns can be mitigated with simple solutions.

For example:

- Use plastic sheets or drop cloths to collect guano.
- Seal entry points to keep bats out of human living spaces (this can be done year-round).

Exclusion may be appropriate if issues cannot be otherwise managed. This may be especially important if there is a risk of property damage, human safety concerns, or ongoing hazards to bats.

Best Practices for Exclusion

Exclusions must be carefully timed to avoid harming reproductive bats or their pups. Installing alternative roosting habitats, such as bat houses, well in advance (ideally a year or more) can help bats adjust to the transition. Although bat houses can improve the success of exclusion efforts, it's important to note that bats typically prefer buildings, which often provide superior habitat. While most bats do not overwinter in buildings or bat houses, thoughtful management ensures that they remain safe and healthy while minimizing homeowner concerns.

Option 1: Leave Bats Where They Are

The best option for bats is to remain where they are. Bats select roost sites that have suitable temperature, security, and other features for them. In some cases, the same bats will use a building for many decades with no problem for landowners.

Situations where bats can be left where they are may include:

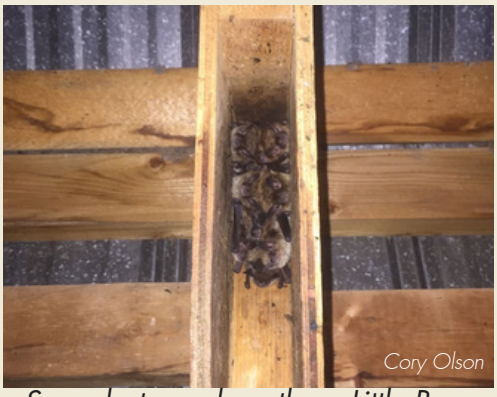
- Bat roosts are in a location such as a shed or barn where guano accumulation is not a major concern.
- Bats are using an external portion of a building where guano can be easily cleaned (e.g. behind shutters or external chimney).
- Issues of smell, noise, or guano can be addressed while still maintaining the bat colony.
- Human living quarters are separated (or can be) from the roost.
- Exclusion is too costly or otherwise not feasible and there are no human health concerns.
- The building is a night roost only, or infrequently used.

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. Exclusion may be required if there are hazards to bats or people that cannot be addressed.

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 getting lost or falling down a chimney (or other access) and not being able to get out (see Eliminating Hazards section). Problems often occur during the fall when young are first learning to fly and are not familiar with suitable roosting options (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, but be careful not to accidentally trap bats.

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.



Some bats, such as these Little Brown Myotis, are welcome occupants of old farmyard buildings.

Bats roosting in patio umbrellas is a common occurrence, especially during fall migration. The best option is to leave them alone. If continued use becomes a problem, wait for the bats to leave and then cover the umbrella, using a tightly-fitting patio umbrella cover, as soon as it is closed.

Check under sinks and in basements where plumbing or HVAC passes through walls or ceilings. These points may provide bats access to inside your home.

Option 1: Leave Bats Where They Are

Ensure that any modifications to the home adheres to the Alberta Building Code and Alberta 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.

Modifications for bat roost sites including plastic sheeting in attics to facilitate guano removal and reduce smell (top) and a tarp hung to prevent guano from falling on hay in a barn (bottom).

Common openings to living areas bats use include:

- attic hatches and doors (including gaps around and under doors)
- fireplaces, furnaces, and chimneys
- around piping or plumbing
- open windows or loose windowsills
- around beams projecting through walls, rooflines, or dormers.
- openings around air conditioners. fans, and ducts
- screens in disrepair
- pet doors (possibly brought in by cats)

Sealing Gaps to Protect Human Living Areas

Once bats are no longer using the building, block access to chutes, ducts, and vents by sealing their initial entry points with chimney caps, vent covers, or other appropriate materials.

Do not seal chutes or ducts at the bottom, as this can trap bats, leading to high mortality. Bats can only climb rough surfaces and cannot fly straight up, making bottom-sealed chutes dangerous. In some cases, a roughened ramp can be used to allow bats to escape.

To prevent bats, guano, and odours from entering living spaces, seal gaps using materials like caulking, spray foam, weather stripping, or screening. Pay special attention to the area around chimneys, vents, pipes, beams and the roof line. Make sure there is no risk of bats coming in contact with wet spray foam or sealant. Preventing access into living spaces can be done at any time of year, but make sure bats will not become trapped.

Identifying bat entry and exit points is essential to ensure that any modifications do not disrupt their access to the roost. While bats cannot chew through sealants like spray foam, adding steel wool may be necessary to deter rodents.

Mitigating Guano and Odour

When bats do not come into contact with people, managing guano is often the primary concern. Containment can be cost-effective and may be a practical alternative to exclusion, especially in drafty buildings where sealing is difficult. Here are strategies to address guano and odor issues without excluding bats:

Removing accumulated guano:

- Remove guano annually after bats have departed for the season
- Use proper respiratory protection, especially in dusty, enclosed spaces.
- Guano can be used as a nitrogen-rich garden fertilizer, but to avoid spreading pathogens, only use in the area it was found.

Protecting property:

- Replace insulation stained by guano or urine.
- Use plastic drop sheets or plywood under roosts to catch guano and simplify annual cleanup.

Option 1: Leave Bats Where They Are

Mitigating Guano and Odour (continued)

Improving Access for People:

- Enhance attic access for easier clean-ups by installing pull-down stairs, creating entry points through gable ends, or similar modifications.
- Install planks on the attic floor to create safe walking surfaces.

Managing Outdoor Guano:

- Install shelves, rain gutters, or planters below roosts to catch or deflect guano in visible areas, such as decks or entrances.
- Clean stained roost entry areas annually when bats are absent to maintain appearance.

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 high-pitch 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 exclusion may be the only viable option.

Eliminating Hazards for Bats

Whether you are leaving bats where they are or planning to exclude them, preventing the accidental mortality of bats is critical. Some objects act as unintended bat traps—following these precautions can avoid the unnecessary death of large numbers of bats:

- **Do not place upright and open buckets, tubs, garbage pails, or other objects in or around the roost**. Bats that fall into these objects often cannot get out. Most bats cannot fly straight up and they cannot climb smooth, slippery surfaces—a bucket is a trap. Remove these objects within a bat roost. Where required, provide an exit route, such as a branch, board or other rough surfaced item that can act as a ramp for bats to climb to access open flight space.

- **Do not use sticky fly ribbon, glue traps, bird netting, and tape.** Bats can become stuck to sticky surfaces so it is important they not be used in areas where bats could contract them (see image panel).

Accidental bat traps, including an old paint tin (top), chimney with hatch closed (middle), and fly tape (bottom).

Option 1: Leave Bats Where They Are

Burdock is an invasive exotic plant in Alberta that is capable of killing large numbers of bats. Once a bat becomes stuck on the burrs, it will call for help from other bats, which may also become trapped.

Rain barrels and other tanks should be covered to avoid trapping bats, which may unsuccessfully attempt to obtain drinking water.

> *For more details on designing bat friendly water sources, download Bat Conservation International's Water for Wildlife guide.*

Eliminating Hazards (continued)

- **Control burdock** (*Arctium lappa*), especially around known bat roosts. The bats can become entangled on the burrs of burdock and are often unable to escape. Trapped bats will attract more bats.

- **Avoid suspended wires** that bats may hit. Some bats are also prone to entanglement on barbed wire fences (especially the top strand).

- **Screen off 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 sure bats are not inside when this is completed. 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 may provide access to the human living quarters. If the chutes are sealed at the bottom, bats that fall down them will become trapped. Extremely high bat mortality may occur because the calls of distressed bats will attract more bats.

- **Ensure there are exit points or coverings in garden ponds, water troughs and rain barrels.** Bats drink while in flight and are occasionally knocked into the water due to unforeseen obstacles. Bats may drown if there are no escape options. Suitable escape options may include wood ramps, boards, or logs (ideally at a 45-degree angle or less). Covering wood in mesh will ensure a good grip for bats to climb.

- **Keep your cats inside**, particularly at dawn and dusk. Domestic cats are very good hunters and regularly prey upon bats. Keeping your cat indoors 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 and are effective and efficient predators of bats. Although rabies is a low-risk, cats can become infected after contact with a rabid bat so it is best to keep cats from preying on bats.

Free-ranging house cats are a significant threat to bats. Cats can hear high frequency bat echolocation calls and use scent cues to find and hunt bats.

Option 2: Exclude Bats

Excluding Bats

Exclusion involves blocking the entry and exit points of a roost (while bats are not present) to prevent future use of the building. The disadvantage of excluding bats is the reduction of insect control. Excluded bats may have reduced reproductive success because they are forced into lower quality roosts. Proper timing of exclusions, combined with the installation of bat houses, can help minimize the harm to bat populations when exclusions are necessary.

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.

Assessing the Feasibility of Exclusion

It is important to assess whether an exclusion is feasible before trying to carry it out. How 'tight' is the building? Are there lots of cracks and crevices allowing entrance to the building space or just a few? 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.

7 STEPS

Seven Steps to Exclusion

Bat 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 appropriate. Adults and young bats that cannot fly may still be present in the roost site at all times of the day or night. The following seven steps break down the process for a bat-friendly exclusion.

Step 1: Know the Basics

Misconceptions about bats can lead to unnecessary or poorly managed exclusions of bats from property. Bats are important components of healthy ecosystems, and provide tremendous benefits to people. Their slow reproductive rate makes bat populations slow to recover from human caused mortality. Bats in buildings typically pose little threat to the safety of people or animals provided they are not allowed to enter living spaces and are not handled. It is illegal to harm bats.

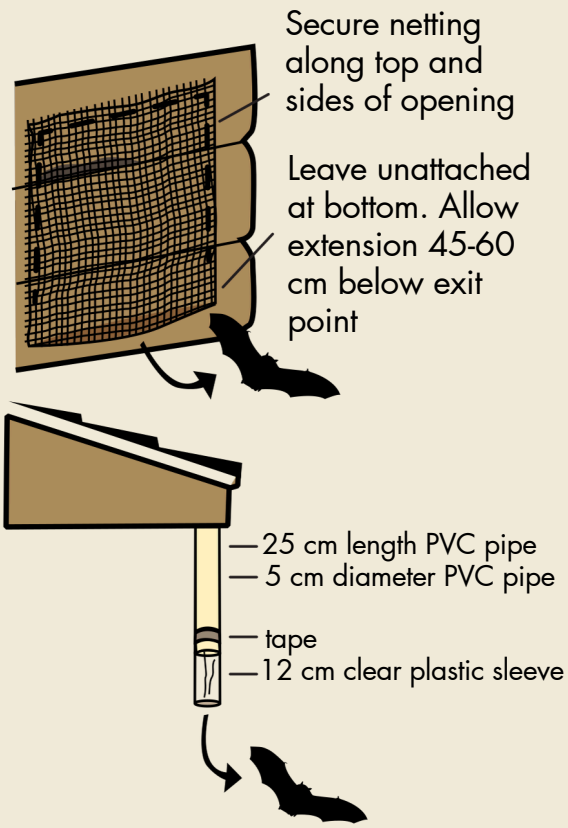
Most bats do not use buildings during the winter. However, Big Brown Bats (shown above) occasionally hibernate in the cooler parts of heated buildings. It is important to determine if this species is present, and if so, to determine whether it is a summer and/or winter occupant. Use of one-way exits is recommended if this species is found roosting in a heated building. Identifying exits during the summer months will help identify locations where one-way exits are required.

Are there bat deterrents?

Various non-lethal deterrents have been used in an attempt to exclude bats, often with limited or no success. Ultrasonic deterrents are typically ineffective, and may even attract bats. Artificial lighting may cause bats to move to more shaded areas, but they often resist leaving once they are established. Adding structural clutter (e.g., streamers dangling from the roof) may persuade bats to move, but not necessarily to a different building.

Option 2: Exclude Bats

One-way exits are a great option to ensure any residual bats are not trapped inside a home and can provide a safeguard in case there are over-wintering bats. However, the preferred option is to wait until bats leave on their own. Bat pups cannot leave without their mother, so one-way exits are not effective during the maternity season (approximately June 1 to August 31). If bats must be removed during the spring or late fall, one-way exits should be used.



Two options for creating one-way exits for bat exclusion. Upper: fibreglass screen mesh with bottom detached. Lower: tube with mesh bottom to allow bats to exit.

Step 2: Assess the Situation
Before excluding bats, know where bats are roosting, the species, and whether it is a day roost, night roost or winter hibernation site. This will help determine if exclusion is necessary, whether other options exist, and the best way to go about the exclusion.

Step 3: Protect Human Living Space
Protect human health by preventing bats from entering human living spaces. Seal gaps (e.g. with caulking, aerosol foam, weather stripping or screening) where guano and bats can enter living quarters, particularly around chimneys. Entry/exit points can be as small as 15 mm (5/8") round or 6 mm (1/4") wide and 19 mm (3/4") long. Sealing living spaces can be done at any time of year, but ensure bats are able to leave the building through exterior exits.

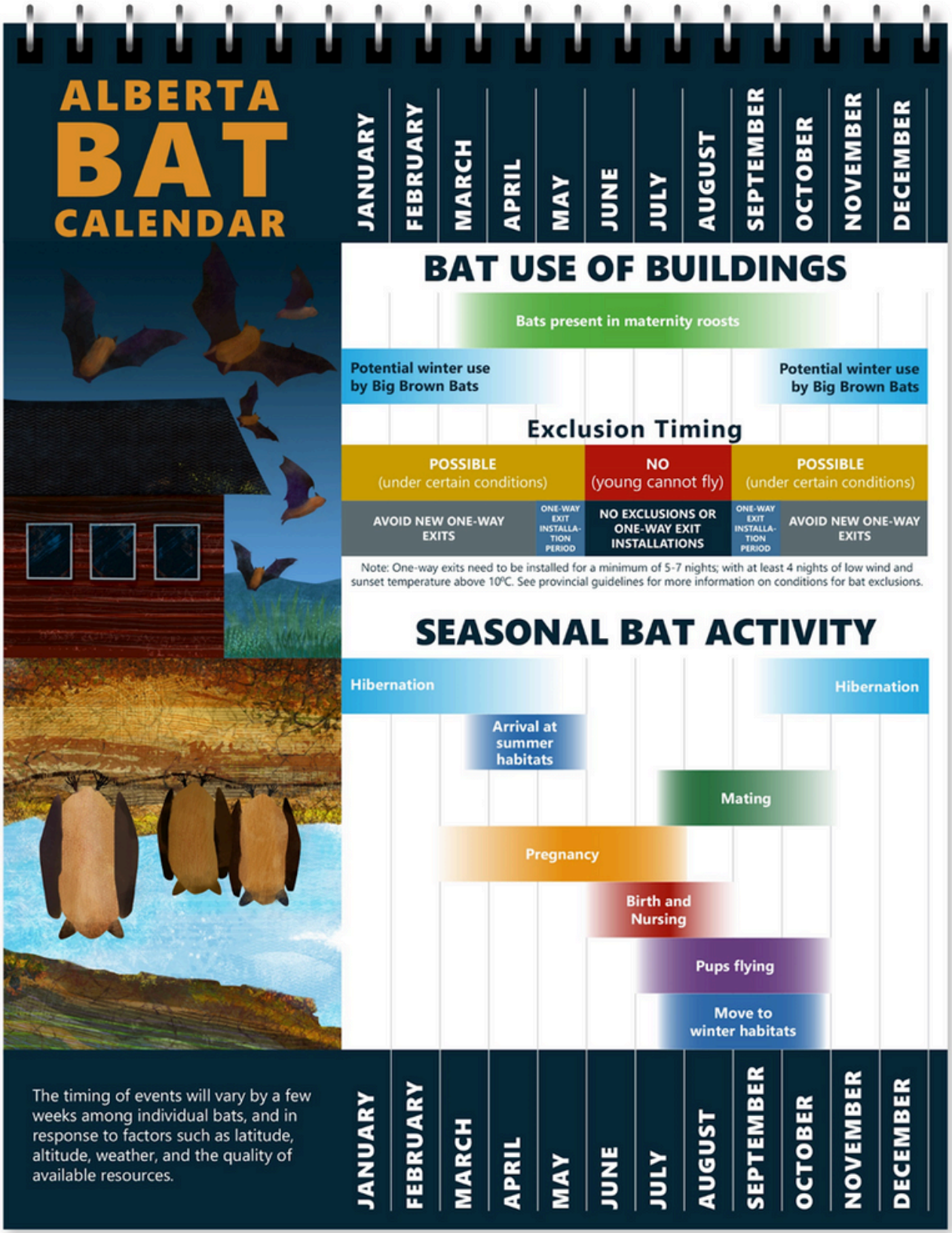
Step 4: Identify Entry and Exit Points
Identify any space large enough for a bat to enter walls or the roof of the house. Look for areas of disrepair, such as where siding or flashing leaves gaps in walls or attics. Inspect your attic during the daytime to see if any daylight is visible through the roof. Watch your house for an hour during the summer (June-July is best), starting at sunset, to see where bats are exiting the building.

Step 5: Install Bat Houses Prior to Exclusion
Bat houses can help mitigate the effect of exclusion on bats. More than one bat house is recommended, with units mounted in both sunny and shaded locations. Warm bat houses during spring are often preferred by bats and may speed juvenile development, but these sunny roosts may be detrimental later in the season when overheating becomes an issue. Bats in bat houses that get a lot of sun on hot summer days can move to cooler (shaded) boxes if available nearby. Large multi-chambered designs are recommended. See www.albertabats.ca/bathouses for more details.

Step 6: Install One-way Exit Devices
If you cannot confirm whether all bats have left the building, then one-way exits are recommended (see side diagram). These exits allow bats to exit, but not re-enter a roost. One-way exits should only be used outside the maternity season because dependent pups cannot leave a roost on their own. In Alberta, Big Brown Bats may hibernate in heated buildings during the winter. If this species roosts in your building, providing one-way exits until the following year is recommended. For overwintering bats, one-way exits should be installed during the fall (September) or spring (May). Making sure to close all alternative access points will be needed to prevent bats from bypassing one-way exits (be sure that bats do not become trapped).

Step 7: Seal Roost to Exclude Bats from the Building
Once bats have left for the winter (see timing), seal any potential entry points for bats into the building, such as by using caulking, aerosol foam, weather stripping or screening. If required, clean up bat guano after exclusion (wearing respiratory protection), and inspect the following year to make sure exclusion was successful.

TIMING IS CRITICAL



Key biological events in the bat annual calendar. Coloured bars represent the time period of each event, colour intensity reflects the % of the populations engaging in the activity over time (darker = more). Overlap of coloured bars indicates the natural variation in the timing of events.

Option 2: Exclude Bats

Key Considerations:

Risks to Bat Pups

- *Bat pups are born in June or July and are flightless for about four weeks while they nurse.*
- *By August, most pups are weaned and able to fly, but this may occur later during years that are cold and wet.*
- *Exclusion during the pup season can leave young bats trapped, causing their death and potentially increasing human-bat contact.*

Risks to Pregnant Bats

- *Pregnant bats arrive in spring, and exclusions as early as March 15 can result in reproductive failure, even without directly physically harming bats (e.g., stress-related losses).*
- *Avoid exclusion after mid-March unless absolutely necessary. If an exclusion is planned in spring, ensure it happens before pups are born and always use one-way exits.*

Bat pups, such as those of the Long-legged Myotis shown Above, are unable to fly, and stay behind in the roost while the mothers forage for insects. Improperly timed exclusions may result in the entrapment and death of pups, or delayed development, leading to reduced overwinter survival.

Timing Bat Exclusions

Proper timing of bat exclusions is essential to avoid trapping bats inside their roosts, which can harm the bats and create additional issues for homeowners. Missteps in timing can result in dead bats, odours, or increased human-bat interactions.

Variation in environmental conditions will affect the timing of reproductive events for bats. Always check with local experts to refine the timing windows for your area!

Seasonal Guidelines:

- *Spring (March 15 – May 31):* Limited exclusion may be possible. Use of one-way exits for sites with hibernating bats should be limited to May to avoid stranding bats in freezing conditions with no options for shelter. Pups are not expected to be present before the end of May, but for pregnant females (maternity colonies) spring exclusions may still pose a high risk of reproductive harm (e.g., pregnancy losses or delayed maturity).

- *Summer (June – Early August):* Exclusions are not appropriate because pups are likely to be present and they cannot leave on their own. There is a high risk of reproductive failure if exclusions are done during this period.

- *Late Summer to Fall (August – October):* Maternity colonies begin dispersing once pups start flying, but some bats may remain in buildings until late October. One-way exits are best installed in September if Big Brown Bats are present (or the species cannot be determined). Installing one-way exits in September will avoid reproductive bats but still allow them to leave while it is warm enough to find an alternative place to hibernate.

- *Winter (November – March):* This is the ideal time to exclude bats that only use buildings during the summer months (e.g., Little Brown Myotis) because they should be gone until the spring. Be cautious if there is a chance that Big Brown Bats are present because they may hibernate in buildings—properly timed exclusions (September or May) using one-way exits may be needed if Big Brown Bats are present.

Risks of Improper Timing:

- *Trapped Bats:* Sealing roosts prematurely can trap bats inside, leading to:
  - Death from dehydration, causing foul odours.
  - Bats entering living quarters in search of exits.
- *Increased Human-Bat Contact:* Bats despretly trying to get back into a building, or to leave from areas they are trapped, will increase the risk of bats entering areas where people are living. This may increase the risk of bites and rabies exposure.

Option 3: Enhance Bat Habitat

Enhancing Building Roosts

Recommendations to avoid improper timing:

- Always follow the bat calendar or consult with an expert.
- Watch exits for an hour, at sunset, to see if anything flies out. Follow protocols for emergence counts (e.g., warm, calm nights).
- Use one-way exits to ensure bats can leave but not return.
- Avoid sealing roosts completely until November, unless confirmed unoccupied.
- When it is necessary to exclude Big Brown Bats, always use one-way exits that are installed during the appropriate timing window (September or May).

Enhancing Bat Habitat

Many bats in Alberta are conservation concerns and rely on human buildings to survive and successfully reproduce. Landowners with bats on their property can play an important role in their stewardship and management. Enhancing bat habitat should be considered if:

- Bats do not create issues for owners, or issues can be addressed.
- Landowners have an interest in environmental stewardship.
- Landowners would like increased insect control or other benefits of a healthy bat colony.
- The enhanced habitat will be available for the long-term and be safe from threats such as vandalism, cats, and human disturbance

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

Within Building Roosts

Enhance crevices

Bat species that roost in buildings in Alberta prefer small (about 1" or 2.5 cm) crevices. Increasing the number of crevices will provide increased roosting habitat. For example, attaching plywood to rafters (to create a gap between the two) will provide additional crevice space.

Enhance grip

Bats require a rough surface for landing and hanging within the roost. Roughening surfaces where bats could potentially roost may allow access to spaces that were previously unusable. For example, where wood is slick, cut grooves or attach rough-textured wood.

Increase darkness

Some roost sites become unsuitable when too much light is present. Increasing darkness may create a more favourable 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. Keeping the gable ends partially open can help attract bats into outbuildings as some species appear to prefer the larger opening.

Installation of a four-chambered bat house on the side of the building prior to sealing the roost.

Roosting structures installed in the attic of an old barn that are used by a colony of more than 1,000 Little Brown Myotis.

Garden features such as ponds and older age class trees improve habitat quality for bats by providing drinking and roosting habitat.

Native plants provide breeding habitat for the insect prey that bats eat. Fragrant early evening flowering plants attract moths which may attract hunting bats. See www.albertabats.ca/resources for the Bat-friendly Communities Guidebook with a list of suitable native plants for Alberta.

> *Not all commercially available bat houses are suitable for bats in Alberta. Before you purchase a bat house, or build your own, ensure it meets minimum design requirements. See www. albertabats.ca/ bathouses for more details.*

Backyard Biodiversity

Bat habitat can be enhanced in the backyard for all bats, not just building-roosting bats. Planting trees, shrubs and forbs will help provide cover and support food webs, while backyard ponds can provide access to drinking water.

Trees

Trees support insect prey and are important for roosting habitat especially ones with cracks, crevices, holes and peeling bark that provide suitable roosting spaces. Old, tall, large diameter trees are most important for bats. Native species of trees are most likely to support insects targeted by bats.

Water

Bats require access to clean, calm water where there is a clear flight path (they do not land to drink). They will try and drink from watering troughs, rain barrels and pools but can easily drown if they fall into a structure that they cannot escape from. Water features should be equipped with rough climbing surfaces or ramps that enable bats to escape. They cannot grip smooth plastic and usually cannot takeoff directly from the surface of water.

Fences

Avoid installing fences, especially wire strands over water features like ponds or streams. Bats may have difficulty detecting wires and this can cause them to crash into water bodies or get entangled in barbed wire.

Gardens

Bat-friendly gardening creates safe habitats by planting diverse vegetation to attract insect prey and preserving mature trees for roosting. Adding water features with safe exit ramps ensures bats can drink without harm. Plant trees, shrubs and forbs that occur naturally in your geographic area (see our Building Bat-friendly Communities Guidebook for a list of native plant).

See the "Building Bat-Friendly Communities Guide" for more details on enhancing habitat and managing hazards around buildings.

Option 3: Enhance Bat Habitat

Backyard Biodiversity and Bat Houses

Bat Houses

A bat house, or bat box, is a human-made structure that provides bats with a warm, dry, and safe place to roost. They are similar to birdhouses in that they are typically wooden boxes that can be installed in gardens, on buildings, or on tall posts, but are typically larger. Bat houses are useful in areas where human activity has reduced natural roosting options, such as previously forested areas that have been permanently altered (e.g., many urban areas) or areas where decaying trees are removed for safety or appearance. They are potentially valuable for reducing the impacts on bats that are excluded from buildings, provided they are set up well in advance. Alternatively, some buildings can be modified to safely accommodate bats (see Enhancing Building Roosts).

While bat houses can support conservation, they may not provide the same quality of habitat as natural or building roosts. Single-chambered or small bat houses can expose bats to extreme temperature swings, potentially lowering reproductive success or even causing the death of pups during heatwaves. Also, most of Alberta's bat species will not use bat houses or buildings, and are entirely reliant on natural habitat.

Rocket boxes (left) and back-to-back four chamber houses (right) are two commonly used bat house designs.

Planning a Successful Bat House Project

Bat houses help compensate for lost roosting habitat in urban, agricultural, and industrial areas where natural habitat is unlikely to be restored. They can also serve as temporary solutions alongside efforts to restore natural roosting options, like tree habitats, bridging the gap until these become viable.

When planning a bat house project, consider location, color, and sun exposure to ensure optimal conditions. Using multiple bat houses with varying designs and sun exposure is recommended. For larger projects, a bat condo—a large structure resembling a building roost—may be effective for replacing lost colonies. However, bat condos can be expensive and complex to install; multiple well-placed multi-chambered bat houses can often achieve similar benefits. Since bats use roosts for many years, bat houses are a long-term commitment involving periodic maintenance and replacement.

To ensure success, use an approved design and size suited to local bat species. Many commercial bat houses do not meet our minimum guidelines. Larger multi-chambered bat houses are ideal as they offer more roosting space and allow bats to move between chambers to regulate temperature, protecting pups from extreme heat or cold.

For more details on bat houses, refer to the Alberta Bat House Guidelines and the Summary of Best Management Practices for Bat Houses in the USA and Canada.

Bats crowding near the ventilated areas of a bat house in British Columbia to escape intense heat. Pink bodies are bat pups, which are more susceptible to heat stress because of their small size.

Not all commercially available bat houses are suitable for bats in Alberta. Before you purchase a bat house, or build your own, ensure it meets minimum design requirements. See Alberta Bat House Guidelines for more details and installation advice.

Bat Condo located southeast of Edmonton was installed after an exclusion to encourage bats to stay.

> *Visit the Alberta Community Bat Program webpage for more information on region-specific bat house recommendations, blueprints for bat house designs, and guidelines for installing bat houses in Alberta. www.albertabats.ca/bathouses*

Follow recommended installation guidelines specific to Alberta. All bat houses and condos need to be installed correctly to effectively provide bat habitat. Refer to the Alberta Bat House Guidelines for information on suitable installation methods.

Install a diversity of different bat house options. In natural environments, bats may use dozens of roosts over the summer, each with different conditions—bat houses should be no different. Ensure multiple options are available. Face them different directions to provide a range of sun exposures (e.g., full sun, partial sun, and full shade).The bat houses should be within a small area so bats can become familiar with their location (e.g. 100 metre radius).

Bat houses and condos should be maintained and monitored for use, and data on characteristics of the structure and its occupancy by bats can be contributed to the Alberta Community Bat Program. This information will advance our understanding of bat roost preferences, and help improve recommendations in the future.

How many bat houses are needed for my bat colony?

The below table can be used to determine the minimum number of bat houses needed to provide potential alternative locations for building colonies. If combined with exclusion, be sure to provide more than the minimum number needed (base this on counts of emerging bats). Regardless of the purpose, multiple bat houses should be installed to provide a range of different conditions for roosting bats—these should include bat houses in both sunny and shaded locations.

CAPACITIES OF BAT HOUSE DESIGNS

Bat House Design	Potential Capacity [1]	Comments
Small Multi or Single Chamber	< ~25	Usually solitary bats
Single-Chamber	<100	Prone to overheating
Four Chamber Nursery House	200-300	
Five Chambered Nursery House (modified four-chamber)	400-500	
Two-Chamber Rocket Box	~300	
Mini-Condo or Condo [2]	1,000+	

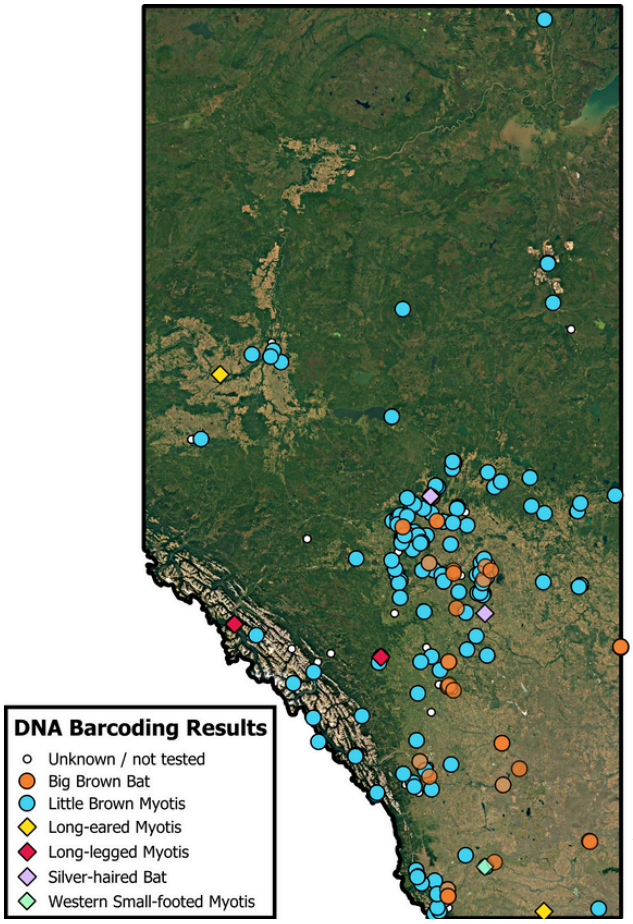
Notes: [1] capacity estimates are approximate; [2] Large condos could support thousands of bats, but roosts seldom exceed one to two thousand individuals in Alberta.

Community Science

The Role of Community Science

Bats are some of the most common wildlife in our communities and many live on private land. Reports of bat sightings can be a powerful way to understand how bats are using habitats, and knowing the locations of roosts provides opportunities for supporting monitoring and research programs. The Alberta Community Bat Program has been operating a community science project since 2016. Some of the ways community science reports have been used include:

- Determined what bat species use buildings in Alberta (about 85% of all reports are Little Brown Myotis, with most of the remainder being Big Brown Bats).
- Expanded the known range of bat species in the province (e.g., we now know that Long-eared Myotis occur in the Peace region)
- Tracked the spread of the fungus responsible for White-nose Syndrome.
- Developed better practices for the use of bat houses.
- Collected samples used to examine what bats in Alberta are eating.



Map of community science contributions (to 2023)

To participate, visit:

www.albertabats.ca/communityscience

Unlike mice droppings, most bat guano is concentrated in a localized area. Look up and you may see roosting bats.

Most bat species can be identified to species using a relatively inexpensive genetic test. The Alberta Community Bat Program may be able to have your sample tested free of charge if a roost report is submitted to the community science program.

Visit www.albertabats.ca/communityscience to learn more about the citizen science project

Other Resources

Juliet Craig


Erica Konrad

WCS CANADA BAT PROGRAM WEBSITES

- Alberta Community Bat Program: www.albertabats.ca
- Western Bat Program: wcsbats.ca
- BatCaver Program: www.batcaver.org
- Bat-Friendly Canada (Online Training): training.canadabats.org

WCS CANADA SOCIAL MEDIA

- Facebook: @albertabats
- Instagram: @ABCommunityBatProgram
- YouTube: @albertabats
- BlueSky: albertabats.bsky.social

WHITE-NOSE SYNDROME & WILDLIFE HEALTH

- Canadian Wildlife Health Cooperative: www.cwhc-rcsf.ca
  - Bat Health
  - Brochures (Rabies & Histoplasmosis)
  - White-nose Syndrome & Pd Maps
- Government of Alberta
  - Bats & Public Health
  - White-nose Syndrome
  - Human Wildlife Conflicts—Bats

OTHER BAT LINKS

- Neighbourhood Batwatch: batwatch.ca
- Community Bat Programs of BC: www.bcbats.ca

WCS CANADA

ALBERTA COMMUNITY
BAT PROGRAM

email: info@albertabats.ca | web: www.albertabats.ca