

Bat Houses in Alberta

What Are Bat Houses?

Bat houses are conceptually similar to bird houses, but differ in several important ways. For example, the opening is at the bottom, rather than on the side, and bat houses are typically designed to allow up to hundreds of individuals to occupy a single house. Bats do not build nests, but groups of females, sometimes in excess of 100, will come together in a colony for the purpose of raising their offspring. Bats appear to be more finicky than birds when selecting where to live, so careful attention is required to ensure the design, location, and installation are optimal for bats in the province.

Why Build a Bat House?

Bats are a primary predator of nocturnal flying insects and are important components of healthy ecosystems. They play an important role in controlling insects, including mosquitoes and agricultural pests. We do not know how bats are doing in the province, but populations of aerial insectivorous birds have been declining sharply over the last few decades and bats may be experiencing similar population declines. The loss of old large-diameter trees as a result of human development, agriculture, and resource extraction has reduced available roosting structures in the province, and has potential to adversely affect bat populations. The installation of human made bat houses may help mitigate this loss, especially when combined with efforts to restore natural roosting habitat. Although not currently in Alberta, the continuing spread of white-nose syndrome could threaten the survival of many of Alberta's hibernating bat species. Ensuring high reproductive success in bat populations is one way to help offset the potential loss of bats resulting from this disease.

What Species Will Use Bat Houses?

Little brown bats (Figure 1) and big brown bats (Figure 2) are both common in developed areas and are the most likely species to use bat houses in Alberta. Other bat species may also use bat houses, but reports are currently lacking. Little brown bats are listed as Endangered under the federal Species at Risk Act (SARA) because of mass mortality associated with White Nose Syndrome in eastern North America.



Figure 1. Little brown bat (photo courtesy of Cory Olson)

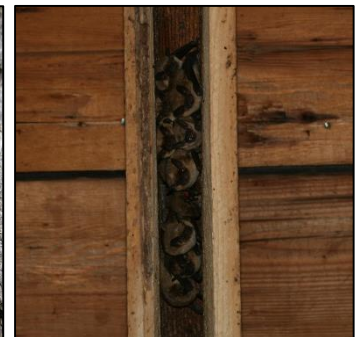


Figure 2. Big brown bats roosting in a building (photo courtesy of Cory Olson)

Bat House Design

Design Options

Bat houses can be purchased commercially or built as do-it-yourself projects. However, many of the available designs are not appropriate for use in Alberta. The weather in Alberta can be highly variable, so it is important that a bat house provides a wide range of thermal conditions (i.e., microclimate) for bats to choose among. Not only will this increase the chances of occupancy, but it may reduce the risk of vulnerable bat pups becoming too hot or too cold during weather extremes.

Huddling is an important behaviour that bats use to stay warm (Figure 2), especially for bat pups, which typically stay behind in the roost while their mothers search for food. Larger bat houses allow more bats to congregate, which makes them more ideal as sites for raising offspring. Most bat houses should be at least 61 cm (24") tall and 43 cm (17") wide. For rocket boxes (see below), the height should be at least 0.9 m (3') tall.

The best designs are those that provide multiple roosting chambers that bats can move among. Two common designs that are ideal for Alberta include Bat Conservation International's (BCI) Two-chamber Rocket Box (Figure 3) and the Four-chamber Nursery House (Figure 4). Rocket boxes have square inner chambers surrounding a central post, which allows a single chamber to have multiple different microclimates, which may be preferred by bats. Single chamber designs may still be used, but may be less able to support large maternity colonies. These and other designs can be found on the Alberta Community Bat Program's webpage (www.albertabats.ca).

Materials

Bat houses can be made of a variety of types of wood, such as cedar, pine, and exterior plywood. Wood has good insulation properties, and often has surfaces rough enough for bats to climb. Weathered or rough-cut wood is ideal and may result in quicker colonization. Pressure treated wood, plastic and synthetic options are not recommended and should NOT be used.

Landing Strips and Roughening

Bats have a different approach to landing than birds. They cannot perch and typically require a drop before they can become airborne. However, they can cling to surfaces and climb using a single claw on either thumb. Their hind limbs have limited use for climbing, but are important when hanging upside down in their roosts. Bats need a landing strip at least 10 cm (4") high and the width of the bat house. The landing strip, and one side of each chamber needs to be roughened to allow bats to grip the surface. Most wood is not rough enough on its own, but the wood can be scored by cutting grooves at least 0.8 mm (1/32") deep at 1.3 cm (1/2") intervals. Creating a rasp by putting nails or screws through a wood block and then scraping the surface to create grooves has also been effective for some wood types. Roughening will be more effective if wood is cut so that the grain runs the same direction as the grooves (i.e., parallel to the ground). Nylon or fiberglass mesh (i.e., screen door fabric) has often been successfully used, but there are concerns that it may wear and accumulate guano or trap bats.

Chamber Spacing

Bats are great at crawling into tight spaces, and often prefer these locations because they are protected from predators and outside weather. The spacing of inner chambers should be 1.9 cm (3/4") apart. Spacing can be increased to 2.5 cm (1") if big brown bats are the target species. Spacing greater than 2.5 cm (1") should be avoided to prevent excess heat loss or colonization by wasps.



Figure 3. BCI Two-Chamber Rocket Box (photo courtesy of Juliet Craig)



Figure 4. BCI Four-Chamber Bat House (photo courtesy of Brook Skagen)

Colour and Finishing

Darker colours will absorb more solar radiation and result in warmer roost temperatures. Bat houses should be stained black in all areas of Alberta. Avoid oil paints or other paints with strong odours, which typically release off-gassing chemicals and may deter or harm bats. Only low VOC (volatile organic compounds) stains should be used. An exterior grade non-toxic (i.e., eco-friendly) stain is ideal. The interior of the bat house usually does not need to be stained. All seams should be caulked to reduce drafts and prevent water penetration.

Bat House Installation

Where and When to Install a Bat House

All nine bat species in Alberta are well adapted to take advantage of natural roosting structures, such as old tree cavities and rock crevices. However, only two species are known to regularly take advantage of bat houses. Bat houses may create a competitive advantage for building-roosting bats, but could increase competition for those species that prefer natural roost features. Therefore, consider installing bat houses in areas where natural roosts have already been destroyed or degraded, such as urban, industrial, and agricultural locations. Installing bat houses in combination with habitat restoration (such as planting balsam poplar or trembling aspen) will provide the greatest benefit. Bat houses are also a great option when eviction of bats from a building is required. Houses can be installed at any time, but it's best to have them in place prior to the arrival of bats in the early spring.

Solar Exposure

Bat houses need to be placed in locations with full sun (i.e., southern exposures with at least 10 hours of direct sun per day). In Alberta, it is unlikely that any amount of sun will be too much, but shaded bat houses are unlikely to be regularly used. During hot weather, having multiple chambers will help prevent heat stress.

Surrounding Habitat

In order for bats to locate and occupy a bat house, it needs to be in an area unobstructed by trees and other objects, especially in the flight space where bats enter and leave the house. However, some sort of wind break upwind from the roost may improve its suitability for bats. Installing the house in an area where bats are known to be active will increase the chances of them being occupied. Ideal areas include those near good foraging habitat (e.g., wetlands, waterbodies or watercourses) and known building roosts. Generally, houses farther than 400 m from a source of open water (needed for drinking and foraging) will have a reduced chance of being used; however, bats can fly long-distances, so there is still potential for use.

Mounting

Bat houses need to be mounted at least 3 m (10') above the ground; however, greater than 4 m (13') is preferred. The height is measured from the top of any ground clutter to the roost entrance.

Houses attached to densely treed areas tend not to be used because of obstructions and shading created by the trees. However, poplar or aspen with little foliage that are standing in the open may still be suitable as a mounting structure. The south sides of building are typically excellent locations for mounting, but bats will typically avoid houses attached to metal siding. Areas with substantial amounts of artificial lighting may also be avoided.

The best mounting option is to use a pole/post (Figure 5) or attach to the south side of a building. For traditional multi-chamber designs, houses installed back-to-back have been successful, and will provide a greater range of microclimates needed by bats (Figure 5). Rocket boxes are typically installed using a pole or post.



Figure 5. Back-to-back multi-chamber bat houses (photo courtesy of Juliet Craig)

Predator Deterrence

Avoid installing houses near suitable perches for aerial predators. Try to maintain the bat house at least 6 m from tree branches, wires, or other suitable perches for predators. House cats are a major predator of bats and they are able to capture bats midflight. Avoid installing the house in a location where cats will have access to emerging bats. A band of sheet metal or smooth plastic 45 to 60 cm wide wrapped around poles or trees directly below the bat house will prevent climbing predators (e.g., cats) from disturbing the colony.

Maintenance

Because bats don't build nests, annual maintenance may not be required. However, roosts should be inspected to make sure wasp nests have not been built in the bat house, and to fix any leaks or structural defects. Bats should not be disturbed when the house is still being occupied.

Monitoring Your Bat House and Reporting Results

How to Know if a Bat House Is Being Used

You can briefly shine a light into the bat house during the day to see if any bats are sleeping inside. However, bats will likely be difficult to see, especially because they are the same colour as the house. A better method is to place something light coloured (e.g., cloth, board) on the ground directly below the entrance, and see if bat droppings (guano) accumulate on the surface (Figure 6). Guano is dark coloured, about the size and shape of rice, and will consist of ground up insect parts.



Figure 6. Little brown bat guano (photo courtesy of Cory Olson)

Bats are capable of regularly moving among roosts throughout the breeding season. As a result, roost use may vary throughout the year. Repeated observations during the breeding period will be required to determine if the roost is being used. It may take a few years for bats to begin using a house, so keep checking.

Citizen Science and Reporting Roost Observations

There are too few reports of bat house results in Alberta to make effective recommendations regarding how to design and locate bat houses in the province. To address this deficiency, the Alberta Community Bat Program has established an online form that participants can fill out to submit their results. Your results can make a valuable contribution to bat conservation in Alberta. Reports of unsuccessful bat houses are just as important as reports of successful bat houses. Visit www.albertabats.ca/roostreports to learn more.

Human Health Concerns

Bats prefer to avoid human contact and typically pose little threat to the safety of people or animals. They have few parasites or diseases that affect people. However, in rare circumstances, people have been bitten by bats and contracted rabies, a virus with serious human health consequences. For this reason, never handle bats with your bare hands, and avoid placing the bat house in areas with high human traffic. Seek immediate medical attention if you suspect you may have been bitten or scratched by a bat. If pets or livestock have been bitten, contact your veterinarian. Bat guano rarely poses a human health risk in Alberta. However, inhalation of dust particles should be avoided in areas where bats or other wildlife have defecated, especially within confined areas such as attics.

Acknowledgements

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Additional resources can be found on the Alberta Community Bat Program webpage

www.albertabats.ca