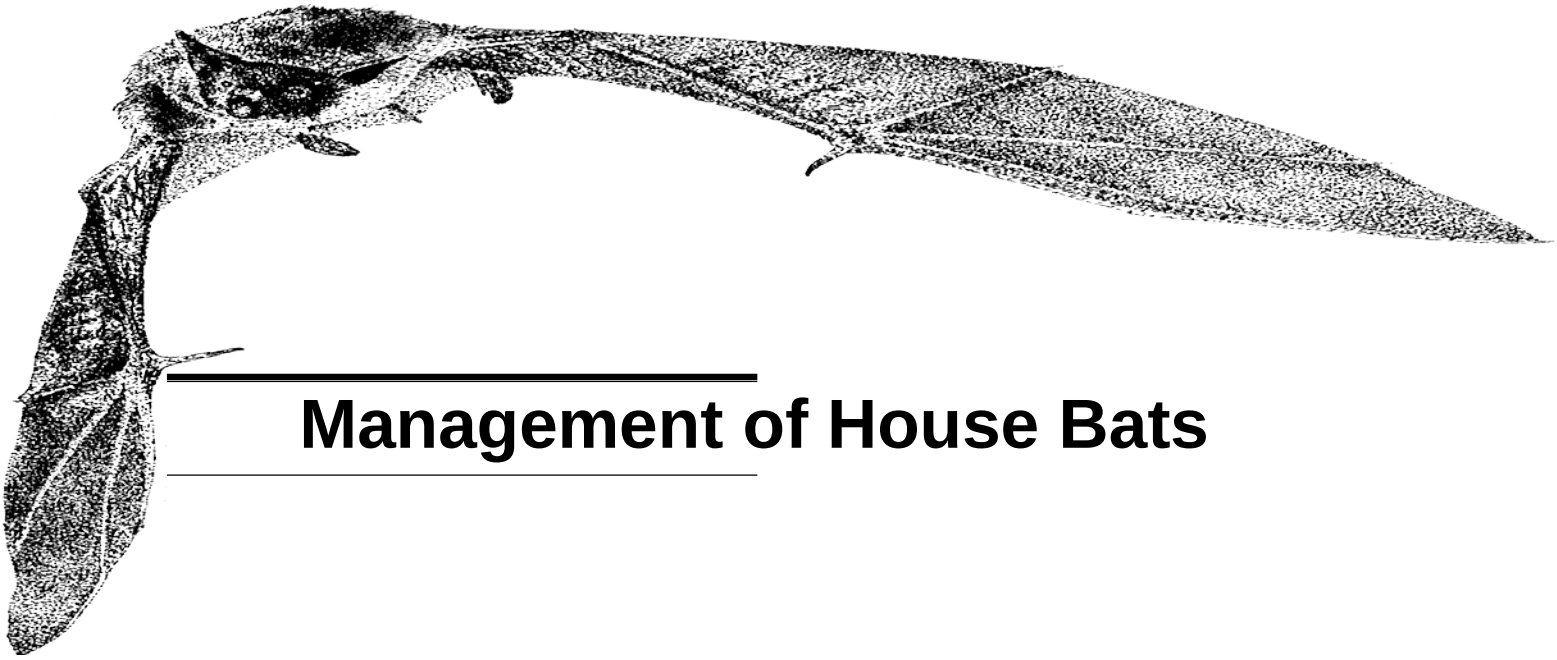


Management of House Bats

Montana Department of Agriculture
Po Box 200201
Helena, MT 59620-0201

Management of House Bats

Montana Department of Agriculture
PO Box 200201
Helena, MT 59621

Bat Biology?

Montana's bats are small, insect eating mammals with true flight ability. Bats are nocturnal. They fly at night in search of insects using a process called echolocation. The process begins with bats emitting a series of high frequency sounds, inaudible to human hearing, which bounce off flying insects and other objects in their path. The echo tells the bat the direction, distance and speed of the object. The bat, using its echolocation system, can capture flying insects and avoid obstacles. Although echo location is the bat's primary method of navigation and hunting, they are not "blind as a bat", but have reasonably good vision. When inactive, bats hide in dark, secluded retreats or roosts.

All 15 species of Montana's bats are migratory, living part of the year in different locations. Spring to fall is spent feeding and rearing young. In winter, they hibernate in caves, trees, buildings and other suitable sites in Montana and elsewhere. Some bats are solitary or found together in small numbers. Other species are gregarious and form roosting or nursery colonies in caves or structures.

Bats inhabit natural roosting sites such as caves, logs, crevices, cracks and holes in trees. Clearing of forests and other human activities has reduced the number of natural roosting sites for bats. Thus, some bat species have turned to roosting in buildings and other structures, such as the Big Brown bat (Fig. 1).

Fig. 1. Big Brown bat.

Since Montana's bats only live where insects are abundant, bats frequently live near lakes, streams, ponds or marshy areas.

What are Bats Good For?

Bats in Montana are beneficial because they eat insects. A typical colony of little brown bats can consume more than 100 pounds of insects in one summer. Researchers estimate that the insect control provided by bats provides an economic value to agriculture of $74 per acre (2007 dollars). Note that this figure does not account for positive impact of reducing the need for pesticide use.

What Problems do Bats Cause?

Bats cause three kinds of problems namely fear, annoyance, and threaten health and safety.

Fear. Many bat complaints arise from people's fear. Folklore, superstitions and the unique nature and lifestyle of bats have all

contributed to phobias regarding these animals. As a rule, these fears are unfounded. Bats are not normally aggressive. But like all animals, they will display defensive behaviors if provoked. Likewise, learning about these remarkable creatures will go a long way in helping turn fear of bats into a healthy appreciation. Readers are encouraged to learn more about bats by visiting Bat Conservation International (http://batcon.org) and the Montana Field Guide (http://fieldguide.mt.gov/).

Annoyance. Bats annoy people when they roost behind shutters, other unwanted areas or fly too close to walking paths and porches.

Bats frequently roost behind shutters, in porches and other areas to rest after a feeding. Some species of bats are solitary bats (rather than communal bats) so it is normal for them to find isolated locations to roost, such as behind a shudder.

Several simple strategies can be employed to convince bats to move elsewhere. After ensuring no bats are behind the shutter, prevent them from returning by securing gaps ⅜-inch or larger. Bat roosting in exposed areas can be shooed away by shining bright lights at their location.

For bats flying too close to walkways, swap the white light bulbs for yellow ones. Yellow lights attract fewer insects than white bulbs. With less prey, bats will need to fly elsewhere to feed.

Threaten Health and Safety.

Histoplasmosis: Bat guano can carry *Histoplasma*, a fungus responsible for causing a disease called histoplasmosis. Histoplasmosis is typically caused when the guano is disturbed (such as sweeping) and the fungal spores are inhaled. Victims often complain of fatigue, dry cough, fever, and other symptoms that may be interpreted as the "Flu." While most people contracting histoplasmosis recover on their own, some, such as those suffering weakened immune systems develop more severe forms of the disease.

To prevent exposure to the spores that cause histoplasmosis, avoid guano contaminated areas. Do not disturb guano, particularly in enclosed spaces such as attics. Small amounts of guano (such as would fit in the palm of your hand) that is found outdoors may be removed as follows:

- Wet down the droppings with spray bottle filled with plain water. Moisture helps keep the spores from becoming airborne.
- Consider the wind direction. Stay upwind or perpendicular to the wind.
- Wear vinyl or water-proof gloves. Use moist disposable towels to clean up guano. Dispose in a sealable plastic bag and discard in a trash can.

Removal of large amounts of guano requires special equipment and training to protect workers and neighbors from exposure to the fungal spores. To learn more about histoplasmosis and guano clean up consult: Histoplasmosis: Protecting Workers at Risk. 2005. Rev. Ed. Department of Health and Human Services, CDC, NCID and NIOSH. http://www.cdc.gov/niosh/docs/2005-109/pdfs/2005-109.pdf.

Structural Issues: When bats occupy human structures their feces and urine can stain ceilings and walls. But over extended periods of time, the guano and urine can threaten structural integrity. The weight of the guano can stress the load bearing capacity of rafters and the urine can weaken wood.

Little brown and the big brown bats are the most common species of bats in Montana. They live in colonies that number from several bats to hundreds of individuals and often inhabit buildings. Thus, the little brown and big brown bat are normally responsible for most complaints from home owners. Complaints mostly occur between Spring and Fall when bats are active in and around buildings. Adult females select common roost sites and rear their young in suitable buildings, usually older structures, close to water and woods where flying insects are plentiful. The actual roost is normally in a dark, warm and poorly ventilated area such as an attic, crawl space or wall space.

Ectoparasites: Bats are afflicted with parasites such as ticks, mites, bat bugs and fleas. In certain situations, such as when bats leave the structure for winter hibernation, these parasites invade living areas and bite humans. Typically, these events are short lived but homeowners suffering from insect infestations should consider the possibility that the parasites came from bats. Sometimes what appears to be bed bugs are actually bat bugs. Bat bugs can be distinguished from bed bugs by looking at the hairs around the head using a 10x magnifying glass. If the hairs are equal to, or longer than, the width of its eye, then it is a bat bug. If shorter, then it is a bed bug.

Rabies: Rabies is caused by a virus that attacks the nervous system ultimately killing the victim. Bats, like all mammals, can carry rabies. Estimates are that less than 0.5 percent of all bats in Montana carry rabies. Unfortunately, we cannot visually distinguish between infected bats and healthy bats. But we can be safe around bats by following some simple guidelines:

- Leave bats alone. Avoid downed bats (bats on the ground), bats lacking coordination or bats resting in direct sunlight. Teach children not to handle bats and to notify parents when they encounter one.
- Do not allow pets to play with bats. Vaccinate dogs and cats against rabies as unvaccinated pets bitten by bats are normally quarantined or euthanized.
- Persons bitten or scratched by bats should wash the wound thoroughly and contact their local health department. If possible, capture the bat that has bitten or had contact with a person or pet using the following steps:

  1. Put on thick gloves (preferably leather).
  2. Get a large-mouthed (five inches wide or larger) jar, cup or plastic container.
  3. Restrict the potential movement of the bat by closing doors, closets and drawers. If the bat has not landed, wait for the bat to land. Avoid letting the bat out of your sight.
  4. Approach the landed bat from one side and place the container over the bat.
  5. Slide a piece of cardboard or stiff paper between the wall or surface and the bat, trapping it inside the container.
  6. Secure the lid onto the container.
  7. Contact your local health department for guidance on animal testing and rabies vaccinations. If officials determine the bat should be tested for rabies, it will often be packaged and shipped by a local veterinarian.

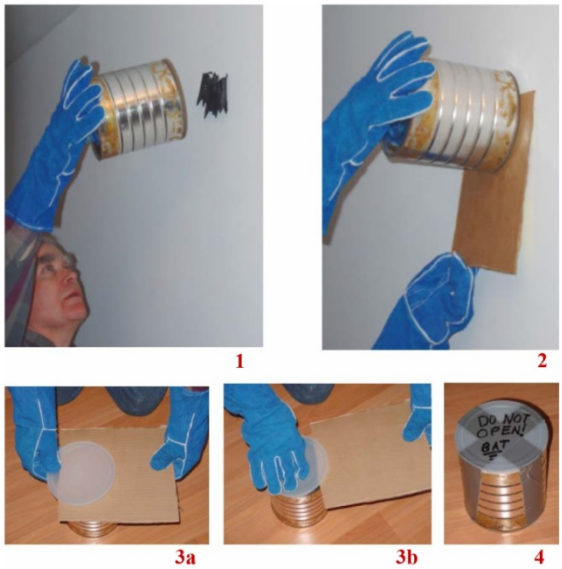


Fig. 2. Steps to capture a bat. Reprinted/posted with permission of Wadsworth Center, New York State Department of Health.

Always capture bats found in rooms with individuals that were sleeping, with diminished mental capacity or young children as they may have had contact with a bat without their knowledge. Research has suggested that sick bats are attracted to intermittent noise, such as snoring. Do not assume that victims or associates would be able to see bite marks. Bats have needle-like teeth that leave marks difficult to see even when you know where the individual was bitten (Fig. 3).

Bats found in the living space of structures (bedrooms, kitchens, basements etc.) should only be released when occupants are certain that no persons or pets have had direct contact with bats. If you have any doubts, contact your local health department.

Fig. 3. Bat teeth are very thin.

If you are certain that neither individuals or pets had contact with the bat, the bat may be released by either watching it fly out of an open window or by capturing them as described above. Release a captured bat high on a tree trunk by reversing the capture process. Do not release a bat on the ground as it needs height in order to fly. Also ground release puts the bat at risk of predation and your pets and children at risk of being bitten.

Are Bats in My House?

Many people that encounter a bat in the living space of their home (not the attic) think that the bat entered accidentally, perhaps through an open window or the chimney. While this is certainly possible, more often than not, the presence of bats in a home indicates bats are residing in the structure.

The following clues are indications that bats are resident in the structure.

- You hear high pitched clicks or scratching from walls or ceilings.
- You discover a bat on two different occasions during the summer.
- You discover a bat during the winter. This clue is proof that bats are hibernating in your home.
- You see staining (Fig. 4), droppings, or bats flying outside your house on a regular basis.

Fig. 4. Notice the dark smudge at the bottom of the seam.

If the clues suggest that you may have bats residing in your home, then your next step is to confirm their presence.

Option 1. Perform a bat watch. On a clear night with low wind (under 30 mph), go outside around dusk. Stand far enough away to see the house silhouetted against the blue night sky. Recruit friends and family to take positions around the house. Watch carefully for bats to appear against the blue sky. The first person to see a bat will help narrow the area where the bat may have emerged. On subsequent nights confirm the location. Keep in mind that bats may have two or more exits from a house. In addition, this method works best when many bats inhabit the structure.

Option 2. Inspect the attic. Because bats don't create nests, they need their roost site to help them maintain body heat. Bats prefer large structures because large buildings have wider temperature ranges. If they get cold, they can move up the structure. If they get too hot, they can move down the structure. Before entering an attic, be sure to wear appropriate safety equipment. At minimum, you should wear a half-mask with a HEPA-rated filter. Only wear the mask if you are healthy enough to wear one and if it is fitted properly to ensure that your lungs are protected.

Take a strong flashlight and inspect the attic. Chances are you won't see bats. But you may see droppings (Fig. 5). Bat droppings, unlike mouse droppings, are in piles and are rough and crumbly. In addition, bat droppings have speckles which are remains of the exoskeletons of the insects. Keep in mind that absence of evidence is not evidence of absence. Frequently houses with small infestations of bats will leave little sign for you to find.

Fig. 5. Bat droppings, known as guano.

Control of Structural Bats

The most effective and only permanent solution to bat nuisance problems in buildings is to "bat proof" by making the building inaccessible to bats. Often there are only a few openings used by bats to enter a building, which makes bat proofing potentially quite easy provided the structure is in excellent repair. Some older homes which may have many small openings makes excluding bats more difficult (Fig. 6). Little brown bats can enter building through a ¼-inch wide space. Look for feces droppings or dark stains on exterior walls or windows to identify points of entry. Odor can also be a sign of a bat entry point.

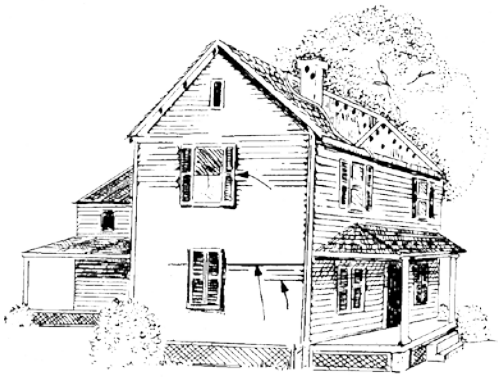


Fig. 6. Potential bat roost sites in a structure.

Normal bat entry points, especially on older homes, include:

- under roof overhangs where wood may be warped, shrunk or rotted
- around loose vents
- through cracks under loose flashing
- at louvers, eaves or cornices
- under loose roofing or sidings
- under doors and around windows
- around chimney pipes
- where wiring and water pipes enter a building, in other words, whenever there is a joint, seam or gap in the structure that may have opened up enough to allow bat entry.

Repair and sealing of these and other potential entry points will exclude bats. All bats should be out of a building before bat proofing begins. The best time to bat proof is in the fall after bats migrate from buildings to their winter roosts. Never bat proof a building between May and July because flightless young may be trapped inside and die. Adult bats will also be reluctant to leave their young and may be trapped inside. Enclosed bats may suffer and die and can create an odor problem.

Bats may occasionally hibernate in buildings in Montana and may still be present in a building in the fall. However, most bats tend to rear their young in one place and hibernate in different location.

If bats are still present after September, begin sealing all entries except the exits used by the bats. Install one-way doors on those exits to allow bats to leave but not return (Fig. 7). After several days, remove the devices and plug the holes permanently. A simple one-way device can be made using a plastic bag with the bottom cut out. Attach one end of the bag securely over an opening and allow the bag to hang loosely.

Fig. 7. One-way plastic valves which allow bats to leave structure but not re-enter.

Bats will drop down and out of the cone as they exit, but cannot reenter.

Be systematic and thorough when bat proofing. Seal all cracks and holes that are a ¼-inch or larger in width. If you think the hole is used as an exit, then install a one-way door. It never hurts to use more one-way doors. On the other hand, if you close an opening that in fact was used as an exit, the bats may enter the living space of the structure as they try to find a way out.

Because of the possibility that bats may enter the living space during the exclusion process, instruct everyone in the building how to respond to a bat properly (See instructions above).

Bats do not chew wood or other building materials as rodents do. So exclusion materials can be simple. Gaps less than ½-

inch wide can be secured with construction sealants. Silicone-based sealants are paintable and remain flexible. Use the right sealant for the surface and weather conditions the sealant will be exposed to. Larger cracks will need backing to help hold the sealant in place. Backing materials can include pipe insulation or other suitable gap filler. Use quality materials as you will want the exclusion to last for years.

Spray on foam crevice fillers, available in an aerosol spray can, will also work well to seal cracks and crevices. But keep in mind that foam will degrade when exposed to sunlight.

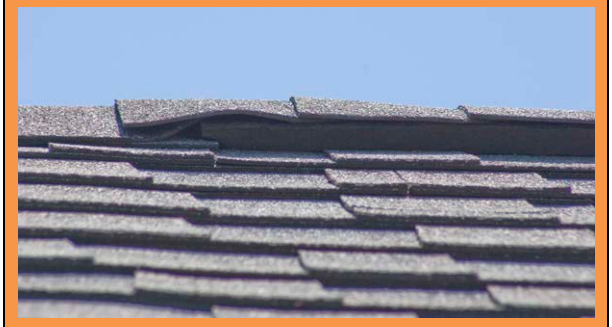
Seal spaces under doors with weather stripping to exclude bats and other small animals. Replace or secure damaged, loose or rotted boards, siding, roofing or other materials. Install flashing where walls meet the roof or chimney and at other joints. Flashing called "Flashboard" is an effective material for bat proofing and has the advantages of flexibility, self-adhesiveness and convenience.

Ensure all vents are properly installed. Place screens over vents with openings ¼ inch or greater. Hardware cloth ¼-inch mesh can be stapled over vents. Keep chimney dampers closed when not in use. Spark arresters or stainless-steel chimney caps should be installed on chimneys to reduce the likelihood of bat entry. Do not lay hardware cloth over the flue. Failure to use professionally manufactured screens and caps can result in exhaust fumes being obstructed and entering into the structure.

Fill spaces in walls and roofs used by bats with fiberglass or rock wool insulation. This also improves the building's insulation efficiency. Bats should not be present when this is done because if they are trapped inside they will die and decay.

Side Bar Bat Inspections

When looking for gaps in a structure, it can be helpful to know that shining a bright light at a dark spot will reveal whether it is a true hole or not. If a dark spot remains dark after illumination, then the location is a hole. If you see the building reflect back, then you know it wasn't a hole. Notice how illumination shows the gap in this ridge vent.



Side bar: Top photo lacks illumination. But the bottom shows the gap.

Many houses are constructed using cedar shakes or shingles both for roofing and siding. Occasionally, Spanish style tile roofing is used in Montana. Construction using these types of materials is not tight and provides bats with innumerable roost sites under the shingles or tiles. In most cases, the bats will not have access into the structure but may be heard from the inside. Caulking is impractical in these situations.

Polypropylene bird netting can be used on problems of this type and is a practical solution. The netting, which is UV light resistant, can be spread over the roofing or

siding and will last several years before replacement is necessary. The ¼-inch mesh netting is not invisible but blends in fairly well against the structure.

Exclusion can be a tedious and time consuming task, but it is the only truly effective way to permanently eliminate bats from a structure. Keep in mind that exclusion works whether the structure has one bat or a thousand. Numbers do not matter as the process is the same.

White-nose Syndrome

White-nose Syndrome is disease that affects bats, which ultimately leads to their untimely death. The syndrome is caused by a fungus that attacks the skin of bats (Fig. 8). The irritation of the fungus wakes them up during the hibernation period which forces them to use up precious fat reserves needed to survive the winter.

Fig. 8. A little brown bat infected with the fungus that causes white-nose syndrome (see the white on its nose).

This disease has killed countless thousands of bats in the eastern half of the United States. Fortunately, it has not reached Montana at this time, but it could. Since the fungus can be spread by contact, it is strongly recommended that bat exclusion equipment (one-way doors, etc.) be either discarded or cleaned after use to prevent any chance of spreading the fungus.
Details on cleaning equipment can be found at https://www.whitenosesyndrome.org/topics/decontamination or by contacting the National Wildlife Control Operators Association (NWCOA.com).

Bat Traps

Bat traps are devices used to capture bats as they exit the structure (Fig. 9). Advocates of bat trapping say that bats can be removed and translocated to another area.

While translocation of nuisance bats sounds appealing, it is not advisable. Bats can fly great distances and will likely return. Also translocation can move a disease to a new area or expose healthy bats to diseases they wouldn't have been exposed to. Trapping of bats should only be used for scientific research or when the colony is infected with a disease which government personnel believe should be eliminated.

Fig. 9. Bat trap.

Repellents

Many suggest using moth balls to evict bats from a structure. Unfortunately, such advice can threaten the health and safety of the structure's inhabitants. First, moth balls are made from either naphthalene or para-dichlorobenzene. Both chemicals are suspected of causing cancer. Second, neither chemical is registered for use on bats. When evaluating whether to use other repellents sold on the market, be sure to read the label carefully before purchase to determine if the product is suitable for your situation. In addition, check to ensure the product is registered, and therefore legal to use, in

Montana by visiting https://mtplants.mt.gov/ProductRegFSA/BrandSearch.aspx.

There is no evidence that ultrasonic devices will evict bats from a structure. Though bats can hear in the ultrasonic range, ultrasound cannot turn corners to reach bats in walls. In addition, ultrasound is a weak wave and does not carry far.

Likewise, avoid using sticky repellents, such as those made from polybutene, to repel pest birds from buildings. They are not labelled for bats and bats tend to avoid or crawl over them.

Habitat Modification

Habitat modification involves changing the conditions that attract bats to a location. As a rule, the following techniques have only a small chance of evicting bats from a structure. They are likely to be more effective when used BEFORE bats take up residence. But research on both techniques is lacking.

Illuminating the attic with floodlights or light bulbs strung will harass bats. But they are more likely to move into the walls of the structure rather than abandon the site. If you choose to use lights be sure that you install them safely to avoid starting a fire.

Because bats need high temperatures (often 95°F or higher) to raise young, some have suggested that cooling the attic space will prevent and/or cause bats to leave. Research is lacking to prove this belief. However, if you choose to try it, seek to keep the attic temperature to about 80° F.

The wind from fans may also deter bats as bats avoid flying during high winds. As stated before, research is lacking for this supposition. If you use fans, be sure they are installed properly to prevent fires and injury.

Poisons

No poison is registered for controlling bats in Montana. Use of an unregistered poison is illegal and poisoning bats may do more harm than good. Killing bats only delays the permanent solutions of bat proofing. If the site provides a desirable roost for bats once, other bats will continue to use it in the future. Use of poison may scatter sick and dying bats to locations accessible to children or pets increasing the chance of bat bites. Bats dying in the structure may die in inaccessible locations resulting in odor problems when they decay.

Bat Conservation

Bat numbers in the United States and throughout the world have been declining. This is largely the result of loss of habitat and the disturbance of caves and other hibernation sites, which provide food and shelter.

Public awareness and appreciation of the beneficial aspects of bats is important in reversing this decline. Bats can help reduce (not eliminate) nuisance insects, such as mosquitoes and beetles. You may wish to attract bats to your home or acreage. Bats can be attracted to roosting boxes just as birds are attracted to bird houses.

Ideally, bat houses should be within ½ mile of aquatic habitats (Fig. 10). Those located at a greater distance have a much lower chance of being occupied by bats. The width of the entry should not exceed one inch. The ideal width is only ⅜ inch. All inner surfaces must be rough enough to allow bats to climb with ease. Use rough lumber or roughen wood with a steel brush or a coarse file.

Place bat houses on tree trunks or buildings about 10 to 15 feet above ground, preferably where they receive sun in the morning and shade in the afternoon. Since bats are temperature sensitive, place the house at a site where it warms up quickly in the morning but does not get too hot in the afternoon. Make the house from ¾- to 1-

inch lumber to provide some insulation overnight.

Houses can be left unpainted or they can be painted or stained a dark color to better absorb heat in the mornings. Bat Conservation International has other designs for bat houses available. They can be reached at http://www.batcon.org/.

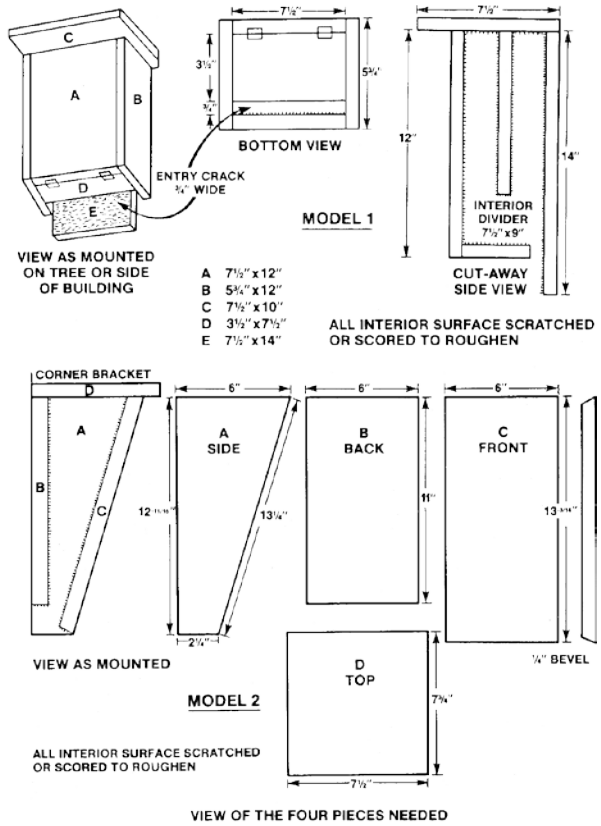


Fig. 10. Bat house design. Place 10 to 15 ft. above ground in sites protected from afternoon sun.

DEPARTMENT SERVICES

As with most programs, control of vertebrate pests will be most effective when all affected landowners work together. The Montana Department of Agriculture vertebrate pest specialist program will work with county commissioners, extension agents and landowners to establish a program suited to local and county needs. Field demonstrations are provided to inform landowners how, when and where to control vertebrate pests. Interested individuals should contact the Montana Department of Agriculture.

In Lewistown:
Stephen M. Vantassel,
Vertebrate Pest Specialist
Phone (406) 406-538-3004 svantassel@mt.gov

In Helena:
Linda Johns, Program Supervisor
Phone (406) 444-3676
ljohns@mt.gov

Additional printed information on the control of ground squirrels and other vertebrates is available from the Montana Department of Agriculture website http://agr.mt.gov/Programs/Pesticides/VertebratePest/Bulletins/

MONTANA POISON CONTROL
(Emergencies) 1-800-222-1222

MONTANA DEPARTMENT OF PUBLIC HEALTH & HUMAN SERVICES

Injury Prevention Program
1-406-444-4126
http://dphhs.mt.gov/publichealth/EMSTS/prevention.aspx

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Fig. 7. BatCone
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Fig. 8. U.S. Fish & Wildlife Service
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Fig. 10. Unknown