Building A Better Bat House

The complete Guide to Assembling, Placing and Maintaining BCM’s Multi-Chamber Bat Houses and BCM Bat House Kit

www.batmanagement.com
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### About Bat Houses

The bat house you are about to install is capable of accommodating any of at least 14 different species of North American bats. However, there are several serious deal-breakers for homeless bats, any one of which will eliminate a potential roost from their perusal:

- Poor design  
- Poor construction  
- Poor placement

BCM bat houses provide a leg up in the Chiropteran real estate market by incorporating the latest research on artificial roosts in the United States. BCM bat houses are designed and constructed specifically to collect and trap heat in order to meet key bat roosting needs. The wide, airtight roof is an important solar heat collector. The bat house is tall with ventilation slots to create an attractive interior temperature gradient. A landing pad provides a large easy target for bats on approach. Crevice dimensions average a snuggly 3/4", the spacing preferred by most common bat house bats in the U.S. and Canada. Hand roughened interior surfaces provide a safe, permanent gripping texture for bats, especially newborn pups. Additional roofing material (included) extends the life of the bat house by protecting against sun, water, snow, and ice. All joints are heavily glued during assembly to help the bat house trap heat. (This is a task BCM designers take seriously when constructing bat houses, and so should you if this manual accompanies a ready-to-assemble BCM bat house kit.)

Your most critical responsibility as a new bat house owner is also where you get to exercise your personal creativity. The finished house must be painted an appropriate color in order to absorb heat. Any remaining micro-crevices in the wood or joints must be sealed. And the rest comes down to "location, location, location." Your bat house can be installed on an existing building, but only after carefully assessing the amount of daily solar exposure at the site. Most often the best solution is to mount the bat house on a post located in a sunny spot on the property. To securely attach the box to a post, a specially designed pole mount bracket should be used. An assembled pole mount with hardware is available from BCM (sku #BChmount). If you take pride in do-it-yourself projects and want to get your money’s worth out of your stable of Craftsman tools, you can make your own mounting bracket by following instructions found beginning on Page 11.

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BCM bat houses have been approved by The Bat House Certification Program at Bat Conservation International (BCI) since 1998. Our bat houses continue to meet their exacting standards for exterior and interior dimensions, design features, construction, quality, and accompanying mounting and maintenance instruction.

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For More Information on Bat House Installation, please contact:  

Approved by Bat Conservation International.

1263 Claremont Road  
Carlisle, PA 17015  
717-241-ABAT  
www.batmanagement.com  
sales@batmanagement.com
Choosing a Bat House:

BCM offers a range of bat house options, from the traditional 3-Chamber Wooden Houses & DIY Kits to the rugged, low maintenance Premium 4-Chamber and larger Bat Bunker Plus. All come with pre-roughened wooden internal baffles for a perfect, and safe foothold for your residents...no need for a landing pad screen!

Tip: Regardless of the bat house you choose, all instructions, tips, explanations & suggestions are relevant. PLEASE READ EVERYTHING! Failure to do so is likely to result in an unoccupied bat house.

<table>
<thead>
<tr>
<th>Bat House Style</th>
<th>General Specification</th>
<th>Description</th>
</tr>
</thead>
</table>
| 3-Chamber Wooden Bat House | - Dimensions: 24”H x 18”W x 4”D  
- Weight: 17 lbs  
- Internal Chambers: 3 with 0.75”-1” spacing  
- Capacity: approx. 100 bats @ 2 per linear inch  
- Comes unpainted  
- Asphalt shingle included  
- Optional Pole Mount available | The three-chamber wooden bat house is our original design, best suited for those who prefer a more traditional look. It comes unpainted so that you can choose the appropriate shade of color for your region (see page X to determine the appropriate shade). Go ahead and get creative! |
| 3-Chamber Wooden Bat House Kit | - Dimensions: 24”H x 18”W x 4”D  
- Weight: 18 lbs  
- Internal Chambers: 3 with 0.75”-1” spacing  
- Capacity: approx. 100 bats @ 2 per linear inch  
- Comes unpainted and unassembled  
- Asphalt shingle included  
- Optional Pole Mount Available | The three-chamber wooden bat house kit is for DIY-ers who take pride in a job well done. All the pieces are cut to size and are ready to assemble in an afternoon. Comes with all required hardware, caulk, asphalt shingle, and detailed instructions (please follow carefully to insure the best chance of attracting bats). |
| Premium 4-Chamber Bat House | - Plastic Roto-molded outer shell  
- 4-chamber wooden baffle cluster inside.  
- Dimensions: 24”H x 18”W x 5.75”D  
- Weight: 21 lbs  
- Capacity: approx 140 bats @ 2 per square linear inch of roosting crevice  
- Available in BLACK, GREEN, & KHAKI  
- Fully Assembled, Low Maintenance  
- Optional Pole Mount available | The Premium 4-Chamber Bat House is a low-maintenance alternative to our traditional, smaller wooden bat house. It’s one-piece plastic outer shell provides a safe, watertight, draft free environment for years to come, and is vented in the front to regulate temperature inside the bat house. No painting is necessary and can be installed upon arrival on either a structure or a pole (pole mount recommended). |
| Bat Bunker Plus | - Plastic Roto-Molded outer shell  
- 6-chamber wooden baffle cluster  
- Dimensions: 36”H x 24”W x 8”D  
- Weight: 51 lbs  
- Capacity: approx 288 bats @ 2 per square linear inch of roosting crevice  
- Available in Black, Dark Green & Tan  
- Fully Assembled, Low Maintenance  
- Optional Pole Mount available | The Bat Bunker Plus is for those that want a low-maintenance option with a larger housing capacity. It’s outer shell is a seamless, one-piece designed that will provide a safe, watertight, draft free environment for years to come. It is shipped fully assembled. This can be installed on both a structure or on a pole (pole mount recommended). |
Before assembling your bat house kit, read this entire section:

- Review and organize all items from the “bat house kits part” list,
- Gather all tools and materials from the “additional items required” list.
- Read each instruction step and test-fit parts before gluing and fastening.

Expect to spend up to two hours building and painting the house and allow an additional 20 minutes of finishing before mounting the bat house. After the house is complete it will need to be properly placed. A poorly placed bat house will never attract bats, no matter how well built. If all construction and finishing instructions are followed, and if placed in a good habitat with plenty of direct sunlight, your new bat house has over a 90% chance for occupancy, often within the first or second season.

**Bat House Kit Parts:**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front (1)</td>
<td>Plywood panel with bat-shaped vent and beveled top edge. Roughened on inner side only.</td>
</tr>
<tr>
<td>Back (1)</td>
<td>Largest piece of plywood. Roughened on inner side only.</td>
</tr>
<tr>
<td>Roof (1)</td>
<td>Smallest piece of plywood. Beveled edge. Roughened on inner side only.</td>
</tr>
<tr>
<td>Baffles (2)</td>
<td>Two identical plywood panels, roughened on both sides.</td>
</tr>
<tr>
<td>Roof Strips (2)</td>
<td>Two 1&quot;x2&quot; strips with beveled edges to accommodate the sloped roof.</td>
</tr>
<tr>
<td>Roofing Material (1)</td>
<td>Asphalt-style shingle material to be placed on roof after painting.</td>
</tr>
<tr>
<td>Tube of Adhesive (1)</td>
<td>Requires Caulk Gun. NOTE: One tube will be sufficient to complete multiple houses</td>
</tr>
<tr>
<td>Screws (50)</td>
<td>50 black drywall screws</td>
</tr>
</tbody>
</table>

**Additional Items Required**

- **Screwdriver:** Preferably a cordless or corded electric drill (14 volts/larger) with a Phillips bit.
- **Caulk Gun**
- **Utility Knife**
- **Paint or Stain:** ½ gallon exterior stain or flat paint (Read the “Paint Your Bat House” section on Page 9 for color recommendations). You can also use flat spray paint if you prefer.
- **Spray Paint:** Black Flat Spray Paint to darken the bottom of the baffles.

**TIP:** All wood is roughened on the interior-facing surfaces. Be sure to take note of roughened surfaces and position the pieces with the roughened surfaces on the inside of the bat house during assembly steps.

**Tip:** When applying the adhesive, always release the pressure from the caulk gun to prevent additional adhesive from flowing out of the tip.
Front-to-Side Assembly

1. Inspect Surfaces of All Plywood
   • Separate the plywood parts and inspect the roughened side of the FRONT, BACK, and ROOF (one side roughened). Check both sides of the BAFFLE pieces (roughened on both sides).
     - These surfaces have been scratched to provide footholds for the bats inside the finished box. Footholds make the box more attractive for mother bats searching for a place to raise their young. Bats require as many footholds as possible on the interior roost surfaces.
   • Use a utility knife to add more scratches on areas that seem sparse. Scratch marks should be no more than ¼” apart. Never use a saw to roughen baffles as it may cause the wood to separate.

2. Attach the FRONT and SIDES
   • Stand the two SIDES along the back (longer) edge on a workbench or other flat surface.
   • Apply a bead of adhesive along the entire front (shorter) edge on one SIDE only (Figure 2) and attach the FRONT piece, scratched side down (Figure 3). The sloping edge of the side should neatly meet the sloping edge along the top edge of the FRONT (Figure 4).
   • Secure with four evenly spaced SCREWS.
   • After one side is securely attached, apply adhesive to the remaining SIDE and attach the FRONT with another four SCREWS as above.
   • The FRONT is now attached to the sides (Figure 5).

**Figure 2:** Begin front assembly, one side at a time.

**Figure 3:** One SIDE is about to be attached to the FRONT. Use the other side for support.

**Figure 4:** FRONT is assembled and beveled edges are flush, matching the slope of the roof.

**Figure 5:** Completed front assembly. Smooth excess adhesive along edges where wooden parts meet.

**Tip:** Excess adhesive should be squeezed out from between all joints during proper assembly to assure a good seal. Smooth excess adhesive along all outer edges using a damp cloth.

**Tip:** A surprisingly large number of screws (never nails) & adhesive are necessary to ensure a long-term, air-tight seal.
Back-to-Side Assembly

3. Attach the Back

- Turn the project over and apply a bead of adhesive to the back edge of both SIDES (Figure 6).
- Lay the BACK with the scratch side down onto the SIDES.
  - The top edge of the BACK should extend 2 inches beyond the top edge of the sides. This will form the “mounting lip” that will be used to install the finished bat house to a structure or pole mount (Figure 7).
  - The bottom edge of the BACK should be as close as possible to the bottom edge of the SIDES.
- Securely attach one SIDE only to the back with 6 evenly-spaced SCREWS
- Align the other SIDE-piece with the outer edge of the BACK.
  - Due to minor flaws in the wood, the unattached side may not align perfectly with other side of the BACK
  - Simply pull or push the SIDE to match the back as best as possible and evenly install 6 screws as on the first side (Figure 8).

Tip: The BACK takes a larger number of SCREWS on each side than the front because this is a critical joint that will be holding the entire weight of the finished bat house.

Tip: By angling SCREWS into the ROOF STRIPS, the strips may be installed quickly without screw tips protruding through the BACK or into the interior of the bat house from the FRONT. The same technique can be used to attach the ROOF to the back. If the angle is off and the tips do protrude into the bat house, file the sharp points down or pound them flat with a hammer rather than removing the SCREWS and trying again (i.e. don’t make new holes!). Sharp edges from protruding screws MUST be filed to protect bats from unintentional injury.
Installing Roof Strips & Roof

4. Install Rear ROOF STRIP
   • Place a straight edge across the top of the sides along the mounting lip (the roof itself can be used as a guide).
   • Place a ROOF STRIP on the BACK flush with the guide. This will ensure a solid foundation for the ROOF to sit. Make sure the beveled edge of the STRIP will correctly match the ROOF when attached.
   • Secure the ROOF STRIP to the BACK by angling three SCREWS through the ROOF STRIP (Figure 9). The roof strip may split if the screws are over-tightened, but since the roof screws will eventually go into the BACK, split strips do not compromise the structure.

5. Installing Front ROOF STRIP
   • Center and align the second ROOF STRIP along the inside top edge of FRONT. Make sure the beveled edges of the strip matches the angle of the beveled edge on the FRONT and the angle of the SIDES to accommodate the slope of the ROOF.
   • Attach the ROOF STRIP with three SCREWS drilled from the FRONT at an angle (Figure 10).

6. Attach ROOF
   • Apply a bead of adhesive to the top of the SIDES and the two ROOF STRIPS (Figure 11).
   • Lay the ROOF in position, making sure the beveled edge of thee ROOF fits flush with the BACK.
   • Using SCREWS, attach the back of the ROOF to the BACK. By slightly angling the back SCREWS, the BACK can be “pulled into” the ROOF, forming a tight seal.
   • Attach the remaining portion of the ROOF to the SIDES and front ROOF STRIPS. A large number of SCREWS must be used in securing the roof to ensure a tight seal. Use no less than 14 to attach the roof (Figure 12).

TIP: Pay attention when angling the screws to attach the roof strips. You can accidentally screw your bat house to your workbench!
7. Inspect Seams
   • Apply adhesive to the back of the ROOF where it meets the BACK. Inspect all seams and add adhesive if necessary. The entire top of the box must be airtight to trap heat.

8. Add BAFFLES
   • The two BAFFLES are identical in size but will be staggered when properly installed.
   • Begin with the back (or bottom) baffle. Slide the BAFFLE up into the bottom grooves along the sides of the bat house until it reaches the top.
   • Back it out about an inch to allow for an “attic” space in the top of the box.
   • Secure the baffle with one screw in each of the grooves on each side (Figure 13).
   • Repeat steps with the top baffle.

9. Apply Paint or Stain
   • CAREFULLY read Page 9, “Painting Your Bat House” to determine which color choice would be best for your area. Follow the paint/stain’s manufacturer’s instruction and paint the exterior of your bat house with at least two coats of paint and wait for it to dry.

10. Finish ROOF
    • After paint is dry, apply a thin bead of adhesive where the roof meets the back and in a line over all the screws. Then make an “X” pattern on the roof. Lay the ROOFING MATERIAL on the roof, asphalt side UP, and press into place.
    • Apply another bead of adhesive where the ROOFING MATERIAL meets the BACK. Save remaining adhesive for covering mounting screws later.

11. Finish Landing Pad
    • Use a UTILITY KNIFE to again roughen up the landing plate with scratches. The paint will have filled in previous scratches and the landing plate needs to be extra rough to assist your bats in take offs and landings.

12. Darken BAFFLES
    • Use FLAT BLACK SPRAY PAINT to darken the bottom few inches of each BAFFLE and any exposed screws. Do not paint any further into the interior of the bat house. This will reduce the amount of light being reflected into the bottom of the bat house and increase chances for occupancy. However, this does not compensate for improper placement over shiny, reflective surfaces (see mounting instructions).

13: FINAL INSPECTION
    • Inspect the exterior. There should be visible adhesive around all seams and joints, especially the ROOF.
    • Once you are satisfied that it is airtight, the bat house will be ready to mount. Carefully read and follow location selection and installation instructions in the next sections.
Painting Your Bat House

Temperature is a critical factor when bats consider a roost. Common bat house dwellers need temperatures around 95°F. While northern bats often need considerable heating in their roosts, southern bats, especially in lowland desert areas, may need less. Other than installing heaters and thermostats (which, believe it or not, some bat-loving folks have done), painting your house a suitable color to absorb heat and mounting it in direct sun is the best way to ensure a toasty warm roost. The amount of solar exposure needed to obtain the proper temperature range will vary slightly with local climate and elevation.

In middle and northern latitudes, bat houses should receive a minimum of eight hours (preferably nine or more hours) of direct daily summer sun. Morning sun exposure is very important, especially during cooler days in early spring. Contrary to some previously published information, painting or staining the exterior of your bat house will almost always make it more attractive to bats. Once thought to repel bats due to odor, dark brown or black stain on the exterior of bat houses in cool regions will significantly increase the temperatures inside the bat house. Use a quality exterior paint or stain designed to withstand weather and UV radiation damage. Note: it is still important to carefully caulk all exterior joints to ensure airtight seals, especially around the roof.

Houses intended for warm climates should be colored medium to dark brown, or in exceptionally hot places, light brown or the natural wood color of the bat house. Light colors may reflect the majority of solar heating away from bat houses. In all but the hottest desert environments, bat houses should receive at least eight hours of direct, unfiltered, morning sunlight.

There’s nothing magic about shades of black and brown. Bat houses can be painted any color and adequate temperature gradients can be achieved with shades of green, blue, red, or your custom tone of choice.

In Figure 15, the black shaded areas indicate temperature preferences under 85°F and are recommended for black paint/stain. Dark shaded regions, 85-95°F, are suitable for dark paint/stain. Medium shaded regions, 95-100°F, call for medium paint/stain. Light shaded regions, 100°F and above, are ideal for light paint/stain.

In Figure 16, the color coding corresponds to average daily high temperatures in July. Black shaded regions indicate temperatures less than 85°F, recommended for black paint/stain. Dark shaded regions, 85-95°F, are suitable for dark paint/stain. Medium shaded regions, 95-100°F, call for medium paint/stain. Light shaded regions, 100°F and above, are ideal for light paint/stain.
Selecting the Right Location

After settling on a color, it’s time to pick a place to put your bat house. The bat house should be installed so that it can be: (1) at least 10 feet off the ground, (2) in an open area free from obstructions, (3) oriented south-southeast (a 140° azimuth is optimal) and (4) where it receives at least eight hours of direct morning sunlight. If there is an existing roost nearby from which bats are soon to be excluded, then the new bat house should be placed as close as possible. However, it is not necessary to place the bat house on the existing roost for the bat house to be successful. Also, any bat house in the best location may go unused if there are other available roosts nearby. If you feel you’ve made a mistake in locating your bat house, it is possible, though time-and-labor-consuming, to move a bat house to a new, nearby location. So, be as careful as possible about selecting your initial installation location. If your bat house is occupied and you’ve decided after a couple of years that you’d prefer to have your colony in a different location, you may move the house, during the winter, without causing the bats to abandon the bat house as long as you move it to a location that receives the same daily solar exposure.

Bat houses are most attractive to bats if they are located within 1/4 mile of a permanent slow moving stream, pond, or other suitable water source. Bats will seek water at dusk on hot summer days, and will capitalize on the readily available insect supply associated with the water and water-loving vegetation. Swimming pools are common water sources in neighborhoods where bats have adapted to using man-made watering holes while feeding on insects attracted to nearby outdoor lights.

**Bats houses SHOULD be:**

- Receiving 8+ hours of direct sunlight, beginning in the morning.
- Located in a diverse habitat with many vegetation types that support abundant insect prey.
- Situated within 1/4 mile of freshwater (e.g., a still pond or lake, a smooth-flowing stream or river, a man-made pool or tank).
- Positioned near trees (or other topography that provides "cover" for bats flying to/from foraging grounds), but not shaded by trees.
- Installed near an existing bat roost, especially if bats are soon to be evicted or the existing roost is going to be reclaimed or destroyed.
- Oriented south-southeast to receive morning sun.
- Airtight, with well-caulked seams, especially around the roof.
- Designed with a roughened interior providing secure gripping surfaces, especially for baby bats.
- Placed at least 10-feet off the ground and 10-feet above and away from any obstacles.

**Bats houses should NOT be:**

- Placed in a shaded location.
- Mounted over bright or shiny surfaces that can reflect light directly into the box.
- Located near burn barrels or air vents where smoke or strong wind will disturb bats.
- Installed where the box is prone to vandalism. Bats will abandon the box or young will fall out and perish if the post is shaken repeatedly.
- Set up where it may be repeatedly vibrated or shocked, such as if the mounting post receives regular impact from garden machinery.
- Put in brightly lit areas. Situated on exposed hilltops or other windswept areas.
- Positioned directly along or adjacent to roads. Bats swarm roosts at dawn and are vulnerable to automobile traffic.
- Sited around high, thorny vegetation. Bats need room below and in front of the bat house to maneuver.

Figure 17: This bat house array is located a few hundred feet from homes, near trees, but not shaded by the trees. This photo was taken in the late afternoon, showing the boxes receive direct sunlight nearly all day.
The bat house should be placed within 15-50 feet of a tree line or other protective topography to provide quick cover from predators such as owls. The general rule is to place the bat house as close to trees as possible, but not where it can become shaded by trees (Figure 17). Take into consideration expected tree growth over the next 10 years. Habitat diversity will also benefit bat activity in the area. A combination of forests, clearings, agriculture, and wetlands will produce different types of insects at different times throughout the night and over a season to accommodate a resident population of bats. Bats will not over-winter in bat houses, except in mild coastal areas or extreme southern locations of the United States. However, they are quite loyal to warm-season roosts and will return to a bat house year after year as long as it continues to meet their needs.

Figure 18: These bat houses were carefully placed on a structure. Notice the eave’s shadow barely falls on the edge of the bat house roofs.

Figure 19: Back-to-Back bat houses offer plenty of roost space and temperature options while maintaining a small footprint. The larger box faces southeast.

### Installation

#### Building mounts for installation on a building

Mounting a new bat house directly on a wooden or masonry structure (avoid metal buildings) where bats are being evicted will almost guarantee a successful bat house occupation, provided the box is mounted at least 10 feet off the ground (as well as 10 feet above any obstructions like porch roofs and satellite dishes) and receives enough direct sunlight.

Remember that bats will use the bat house throughout the spring, summer, and early fall, and a large colony will produce an appreciable amount of guano that can over-fertilize the ground directly beneath. Be careful not to mount the bat house directly over window boxes, planters, doors, and walkways. In addition, bat guano may stain certain paints on the mounting structure. The daily dawn return of bats is responsible for droppings that inevitably splatter around the bat house and on nearby windows.

Structure mounting might be desired when evicting bats, or if the yard is too small to for a free-standing pole mount. It is not critical to mount the box on a structure to ensure a successful eviction project. Bat houses do not take the place of systematically bat-proofing the structure. If other roosts remain available, bat houses may see little use.

Be sure to choose the best mounting site on a structure. Pick a location on the structure as high as possible that will NOT be shaded by overhanging eaves or obstructed by split-level architectural elements. Select the southerly side of the structure or chimney. Southeast (140° azimuth) is ideal.

Wooden spacers that are 2”x4”x16” should be placed on the structure first, to minimize any staining the bats may cause. Spacers also help attach bat houses to uneven surfaces (e.g., brick walls or home siding). Galvanized lag-bolts, deck screws, or masonry screws can be used depending on the structure material. Often these screws must be slightly countersunk to allow a secure attachment between the bat house and the spacers. Masonry screws measuring 2 3/4” work well on chimneys, while 3” deck screws are standard for wooden outbuildings. Pre-drill the spacers, as most long screws are difficult to install without stripping the heads. When installing into older block or wood structures, four or more screws may be required to adequately secure each spacer.

The method for attaching the bat house to the spacers varies with how large the bat house is and where on the structure it is located. Small boxes may simply be hand carried up a ladder and installed. A more elaborate solution for a larger box involves hauling the bat house up the structure using a rope and pulley rigged through the top of a ladder. As the box hangs under the ladder it can be secured, by someone using a second, shorter or nearby ladder. Expect some trial and error to get ladder(s) and the bat house into correct positions. Take extra time to fine tune the rigging rather than attempting to hold the weight of the heavy box while simultaneously driving screws.
Pole Mounting a Bat House:
Pole mounting a bat house one summer before planning an exclusion project is ideal. This eliminates the need to move the box off the structure in the long run, and bats have plenty of time to investigate the bat house before being excluded from their preferred roost in the structure.

The bottom of a pole-mounted bat house should be at least 10 feet above the ground without large obstructions in front or below. Pressure treated lumber is the best material for the post and mounting brackets. Posts are available at most lumber supply yards, though 16’ lengths may have to be special ordered.

<table>
<thead>
<tr>
<th>Pole Size for Different Combinations of Bat Houses</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-Chamber Bat House</td>
</tr>
<tr>
<td>4-Chamber Bat House</td>
</tr>
<tr>
<td>Any combination of TWO 3 or 4 Chambers</td>
</tr>
<tr>
<td>Bat Bunker Plus</td>
</tr>
</tbody>
</table>

Using a post-hole tool and digging bar, excavate a hole at least three feet deep and 8-12” in diameter. The hole should be slightly larger than the posthole tool. If the hole is sunk straight and clean only one bag of premixed concrete will be necessary. If more than one box is installed on the post, the hole should be over 3’ deep and will require two bags of concrete.

Other materials required to set a pole:
- Pole Mounting Bracket (Figures 20,21)
- 8 galvanized screws
- 4 -6 galvanized lag screws with washers
- Two 80 lb. bags of pre-mixed concrete
- ½ bucket of water
- 3/8 Socket Wrench for lag screws
- screw driver or cordless drill
- post hole digger & digging bar
- shovel
- post level
- gloves
- compass

Three- and Four-Chamber Pole Mounting
The Three- and Four-Chamber bat house pole mounts consist of two brackets (Figure 20). Each bracket is identical and features two countersunk lag screw-holes. Attach the top bracket to the post with one lag screw and washer. Use the square to make sure the bracket is perpendicular to the post before drilling and installing the second lag screw. Center the lower pole mount on the post. The bottom of the lower pole mount should be about 23” from the top of the upper bracket so the bat house entirely covers the bracket. Affix with two lag screws, again pre-drilling and installing one at a time and checking the bracket with the square.

Bat Bunker Plus Pole Mounting
The Bat Bunker Plus bat house pole mount kit contains three brackets and two sets of six lag screws with washers. Two brackets are identical (the top and middle) while the third bracket (lower bracket) is wider and has a small “shelf” cut into it. Using the larger set of lag screws and washers, install the top and middle brackets using the measurements in Figure 21. Attach the brackets to the post with one lag screw and washer. Use the square to make sure the bracket is perpendicular to the post before drilling and installing the second lag screw. Attach the third bracket, orienting it so the Bat Bunker Plus can sit, supported, on the “shelf”. Lay the Bat Bunker Plus on top of the brackets, ensuring it is sitting on top of the shelf of the bottom bracket (Figure 23). Using the smaller set of lag screws and washers, attach the Bat Bunker Plus to the brackets (Figure 24).
Finishing the Pole Mount

If desired, the brackets and entire post can be painted with a quality exterior stain or paint. Attach the box to the brackets using about eight galvanized screws, four in the upper mounting lip and four through the landing pad.

The size and weight of larger bat houses, or multiple smaller bat houses, may make raising and setting the post cumbersome. If the post and box is to be raised in one operation, simplify the job by recruiting family, friends, and neighbors to help.

To set the post into the hole, two or three people can raise the box while one additional person guides or kicks the bottom of the post into the hole (Figure 25). The box will be very top heavy and the “guide person” must prevent the box from toppling backwards during the lifting. In addition, the box can be pulled with a rope to assist the lifters.

Twist the post so that the front of the box is facing about 140°, or southeast. Center the post in the hole by prying it with the digging bar. The bat house post will have a perfect balance when it is level and allowed to tilt backwards slightly. Use a compass to confirm that the box is facing 140° (southeast) before adding concrete. This allows the bat house to face directly into the sun at 10:00 a.m. on a spring or fall morning. Add concrete following manufacturers directions, or alternate dumping 1/3 of the concrete mix and a small amount of water into the hole and mix with the digging bar. If the hole is too large and concrete mix is scarce, intersperse softball-sized rocks into the mix. Temporary 2”x4” supports can be affixed to help stabilize the pole while the concrete hardens and can be removed after a few days.

IMPORTANT: After mounting, coat the entire upper mounting lip with the remainder of sealant or roofing cement to increase durability. You can also bend a section of aluminum drip edge over the Mounting Lip and glue it into place using plenty of adhesive. Make sure to cover the mounting screws. Touch up with paint to complete.

Figure 22: Bat Bunker Plus pole mount kit brackets installed on a post.
Figure 23: Bat Bunker Plus on brackets, aligning the plastic tabs of the bat house with the wood brackets.
Figure 24: Using the smaller set of lag screws and washers, attach each plastic tab of the Bat Bunker Plus to the corresponding wood brackets.
Figure 25: Raising a post can be manhandled or aided with a rope.
Figure 26: Tree mounting only works in rare situations. There are a few opportunities with very large limbless trees on edges of clearings.
Figure 27: This is the top of a bat house after 5 years of weather exposure. Water seeps into the plywood along the screws that are driven through the Mounting Lip into the mounting bracket.
This premium bat house is an upgrade in size and style over our successful 3-Chamber bat house. It is not just the increased capacity and cosmetic changes that is different; bats have been shown to prefer roosting in larger structures, probably since the larger mass tends to buffer nightly temperature extremes. This means our 4-Chamber bat house is even more likely to be successful than our well-regarded 3-Chamber design. BCM created our own custom mold so that finally, a functional and attractive bat house exterior can be made from a durable plastic material. This eliminates the worries that seams will separate over time, which will render all wood bat houses unattractive for bats.

No drilling or screw driving is required except when mounting to a post or building. Each interior surface has been permanently roughened by hand in various directions for the best "batholds" possible. We DO NOT use screen material for baffles as it has been shown to shred over time and pups can become trapped under it. Our decorative bat design on the front is actually a vent that helps prevents bats from overheating. Your 4-Chamber Premium bat house is shipped fully assembled without any painting required. Choose a dark color for most northern state and high elevations, or sand color for warm climates (see color chart for your area). Includes 16-page manual with complete finishing, site determination, installation, and maintenance instructions.

Created and built in Pennsylvania. A pole mount is strongly suggested if placing this box on a wooden 4"x4"x16' or 4"x6"x16' post cemented 3' into the ground.

Mounting Instructions:

Hardware:
- Four 2-1/2" #8 deck screws
- Three 1-1/4" #8 deck screws
- Seven #10 counter-sunk stainless steel washers

1. Using the provided 2-1/2” deck screws and washers, attach the top of the bat house first to the structure or upper pole mount (see pole mount instructions on page 12-13 in booklet) by screwing directly through the outer plastic shell and into the structure or upper pole mount.

2. Use the provided 1-1/4” deck screws and washers to attach the bottom of the bat house to the structure or bottom pole mount. Screw directly through the landing pad at the marks to attach it to the structure or bottom pole mount.
Maintaining Your Bat House

All temperate species of bats in the U.S. move between warm summer roosts and cold, but not freezing, cave roosts where they hibernate in the winter. Some sub-tropical species live in northern latitudes in the summer and migrate to more southerly locations where they can stay active and find enough insect-food all winter long.

**Bat inventory**

Bat houses can be checked for occupants in two ways. The most direct approach is to stand under the bat house and view the interior using a powerful spotlight (Figures 17-19). This should be done sparingly throughout the first season of occupation. A less intrusive technique is to watch the evening exit, which begins approximately 15 minutes after local sunset and lasts up to thirty minutes.

When bats vacate the box in the fall for their wintering sites, it provides homeowners with the perfect opportunity to perform any needed maintenance. Because bats are very loyal to their summer (and winter) roosts, they will happily return to their re-furbished bat houses in the spring.

**Airtight seams**

View the bat house interior using a spotlight. If bats are present, wait until later in the season to do routine maintenance. Once during each winter, the bat house should be inspected carefully for broken seams or other cracks that will cause drafts and prevent the house from holding heat. Weathering from seasonal temperature changes can cause roof joints to separate after a few years. Daylight entering around the roof is a sure sign of needed repair, but be careful not to mistake broken seals with normal daylight entering through the vent. If left in disrepair, bats may abandon or never utilize a drafty roost. A ladder can be placed against a post-mounted bat house in order to apply fresh sealant over all seams. Also check to make sure the roofing paper is intact. Re-staining or re-painting the bat house every few years will prolong its life and help to seal micro-crevices in the wood and joints.

**Wasp nests**

Paper wasps form gray honeycomb-shaped nests on the ceilings and in crevices of bat houses (an example of this nest can be seen in the upper right corner of the bat house on the cover of this booklet). These insects are not aggressive and happily co-exist with bats. Unfortunately, if the nests become large they will eventually consume real estate inside the bat house. It is best to remove nests in the winter using a long, thin rod or stick. Be sure to do this only when bats (and wasps!) are not present. Check carefully before cleaning because shadows can hide solitary bats in what first appears to be an empty box.

**Yellow jackets and bald-faced hornets**

These very aggressive insects build conical nests that can be as large as volleyballs (Figure 29). Some stealthy varieties also build nests inside the bat house. If a number of insects are seen routinely entering and exiting the bat house in the summer, chances are it is overrun with yellow jackets. Bats will abandon the bat house if these insects take up residence. Destroy these nests early before they become large. Carefully knock out nests at night.

**Woodpeckers**

Woodpeckers may be observed drumming on bat houses and could create holes in the roof or front. The damage can be re-paired by filling holes with fresh sealant when bats are not present.

**Bat overcrowding and overheating**

If bats are constantly seen towards the bottom of the bat house throughout the season or are roosting outside the bat house (Figure 30), the house may be getting too hot. This is best solved by installing a second bat house nearby or on the backside of the first house. Tuning a single bat house is experimental and not recommended. Add a second box first, then experiment later if necessary. Alternately the bat house might need to be “fine-tuned,” perhaps by adding white roofing paper, repainting the box a lighter shade, or moving the box to a different location. Unless other roosts are already in use nearby, fine-

**Warped baffles**

The exterior shell of the bat house should outlast the interior baffles. Over a very long period of time and usage, baffles can become warped (Figure 31). Bats will continue to use the box but capacity may be reduced. It will also become difficult to directly inventory the bats. This is generally not a problem with modern BCM bat houses because higher quality yellow pine plywood is used instead of inexpensive and thinner Luan plywood.

**Guano**

All BCM bat houses are self-cleaning. Droppings accumulate on the ground directly under the bat house. Figure 32 depicts the late summer accumulation under three busy bat houses. This material naturally biodegrades and there is not much need to remove it. Guano is high in nitrogen and makes an excellent fertilizer. It has been mined for centuries from large bat caves for this purpose, prior to the advent of chemical fertilizers. Bat house owners can collect guano from beneath houses and scatter it in gardens or orchards. Too much guano will “burn” plants though, so be careful and be aware that letting large piles sit in one area will kill grass and other plants.

![Figure 30: Yellow Jacket Nest](image-url)
Public Health Information

Remember, bats are wild animals and as such, should be treated with the same respect due to other urban or suburban wildlife. People, especially children, should be instructed never to touch bats or other wild animals that are easily approached. Trained wildlife rehabilitators or removal specialists should be called to collect sick or injured wildlife. If immediate action must be taken with a downed bat, wear gloves when handling it, or scoop it into a box or can with a shovel or similar tool. If there is any chance the animal had direct contact with humans, call a local wildlife or public health agency to collect the individual.

Rabies and bats
Rabies is the only serious public health hazard associated with bats, but its impact has been vastly exaggerated. Florida was the first state to report a case of bat rabies in 1953. By 1978, rabies had been reported in 30 of the approximately 40 bat species normally found in the contiguous United States. No increase in the rate of infection has been detected since that time. In the past 55 years, there have been only 44 human fatalities in the United States and Canada attributed to actual bites of rabid bats. Far more people die every year from dog attacks, bee stings, power mower accidents, or even from being struck by lightning. Unfortunately, newspaper reports and television coverage of bat bites are often sensational, exaggerated, and grossly inaccurate, perpetuating misleading information. Such misleading accounts often elicit intense public reactions that generate vociferous demands for complete bat destruction.

The truth is, there are only six species of bats known to have transmitted the rabies virus to humans. The most common bat house bat throughout most of the U.S., the little brown bat (Myotis lucifugus), has never been implicated in a human rabies case, and the next most common, the big brown bat (Eptesicus fuscus), has been implicated in only one case. Most other cases stem from non-colonial, tree roosting species unlikely to ever use bat houses. Airborne transmission of rabies was suspected during the 1950’s in two biologists exposed to millions of Mexican free-tailed bats (Tadarida brasiliensis) in Frío cave in Texas. As the biologists were shown to have been exposed to the rabies virus through other bodily fluids, airborne transmission between bats and humans could not be proven. Aerosol rabies transmission between bats and other animals has been found to occur in very extreme conditions known to exist in only one cave environment in the world. Aerosol rabies transmission is not a public health hazard with house bats.

Nevertheless, any bite from a wild mammal should always be considered as a potential for rabies exposure. Any bite or scratch wounds should be immediately and thoroughly washed with soap and water. Any bat that has bitten a person or pet should be captured, without destroying the head, and placed in a cloth or plastic bag. Bats should be transported under refrigeration (not frozen) to the nearest health laboratory for examination. Anytime a bat bite is suspected (or if a bat is found in a room with a infant or impaired individual who cannot deny a bite exposure) a doctor or public health department should be contacted in order to obtain the post-exposure rabies series immediately.

Prevention of exposure to rabies
Most rabies exposures could be avoided if people simply refrained from handling any wild or unfamiliar mammals, including bats, but also foxes, coyotes, skunks, raccoons or domestic cats and dogs. Because rabies is almost always fatal in humans, bitten persons need to be immediately treated with post-exposure rabies vaccines. The treatment is 100% effective if received prior to the onset of symptoms. Unprovoked bat attacks on humans are extremely rare, despite exaggerated stories. Bat bites are usually defensive, occurring when people handle sick or moribund individuals. Effective ways to minimize potential human-bat contact include: (1) cautioning the general public not to handle wildlife, (2) exercising care in handling suspected sick wildlife, and (3) supporting mandatory dog and cat vaccinations. Pets that have been bitten by a rabid animal and have not received the rabies pre-exposure vaccination are either quarantined or humanely euthanized.

Histoplasmosis and bats
Histoplasmosis is an airborne disease caused by the microscopic spores of soil fungus, *Histoplasma capsulatum*, which affects the lungs of humans. It can masquerade as influenza, or with more severe symptoms, be misdiagnosed as tuberculosis. Many infections in humans do not produce symptoms or cause distress. Skin and blood tests reveal the presence of an infection; however, a positive histoplasmin reaction may only be evidence of a previous exposure. When soil containing the fungus is disturbed, the spores, and possibly hyphal fragments, become airborne and may be inhaled by people who enter bat roosts.

Fortunately, attics that have harbored bats for many years and contain sizable accumulations of guano are not generally located where the fungus can survive and grow. Most bat-related transmissions of histoplasmosis occur in tropical or sub-tropical caves or other large bat roosts. Relatively few people, even among those actually exposed, become seriously ill. However, there is a small potential risk of infection to anyone intending to remove bat guano, due to spores released by the disturbance. Pest control operators and others proposing to undertake these tasks on a regular basis should be healthy persons with positive histoplasmin skin tests and clear chest x-rays. Some protection is possible by wearing respirators that fit properly and are capable of filtering out particles as small as 2µ in diameter or by using a self-contained breathing apparatus. Respirators should be approved for nuisance dusts by the National Institute for Occupational Safety and Health. Dry guano can be dampened with water before its removal to further reduce the hazard of dust inhalation.
Guano, Urin and Ectoparasites
Bat guano and urin accumulating in attics and wall spaces can attract arthropods, such as roaches, as well as other pests. The accompanying odor from a large bat roost can be pungent, but not dangerous. Bat ectoparasites, such as ticks, mites, fleas, and bugs rarely parasitize humans. They are most likely to cause a nuisance after a house has been bat-proofed (parasites left behind after bats are gone). Parasite problems are unlikely except in very large, well-established colonies where fumigation may be appropriate. Ectoparasites quickly die without their bat hosts.

Figure 31: Large amount of guano in a confined space requires special handling.

Tips and Experiments

It is easier to attract bats using two bat houses back-to-back on a single post. If boxes are oriented southeast and northwest, they will provide a range of temperature options and make it more likely that a particular profile is attractive to bats throughout the entire warm season.

In most areas of the country, common problems with modern bat houses involve the box not receiving enough direct sunlight. This results in it being too cool. It is much easier to cool off a box than to move it to a sunnier location to warm up. In the hottest areas, bat houses can be partially shaded with an overhanging reflective tin roof or a white shingle that can be installed on to of the existing black roof. When in doubt, install the bat house in the sunniest spot.

Bat houses can also become too hot. If bats are always seen at the bottom of the baffles, it is possible that the box is receiving too much heat or is simply overcrowded. The easiest solution is to add a second box on the backside of the first if possible. Or install anther bat house nearby, such as around the corner of the house or up under a shaded eave.

Curious bat enthusiast can monitor the temperatures inside bat houses in several ways. An inexpensive solution is an outdoor thermometer with an external probe. The probe can be attached to a long, thin pole or stick and inserted through the baffles and into the top of any bat house. A more elaborate, detailed study can be made using an Onset Computer Hobo UX100-001 Temp Data Logger (Onset #: UX100-001, $75 from www.onsetcomp.com). This sensor can be left inside a bat house for weeks (up to a year) while recording temperatures at user-defined intervals. The data can then be off-loaded to a computer and graphed. Generally, the target temperature for bat houses used by little brown bats (Myotis lucifugus) is 95°F. If a bat house consistently does not reach or occasionally exceed this temperature in the summer, the box may not be airtight, may be painted the wrong color, or may be installed in a shady location.