

# **BAT HOUSE INFORMATION**



# Attracting Bats

**WHAT ARE MY CHANCES OF ATTRACTING BATS?** How will bats find my bat house? How long does it take? Can I “bait” my bat house with something to speed up the process? These are just some of the most frequently asked questions about bat houses. This page will help answer the basics about attracting bats and about being a responsible bat house

landlord. For more information, please consult the *The Bat House Builder's Handbook*, available at Bat Conservation International's online catalog: [www.batcatalog.com](http://www.batcatalog.com).

The odds of attracting bats are very good for well-designed, well-built bat houses mounted according to recommendations developed by the Bat House Project during 12 years of bat house research by BCI and its volunteer Research Associates across the U.S., Canada and the Caribbean. Here are a few of our latest results:

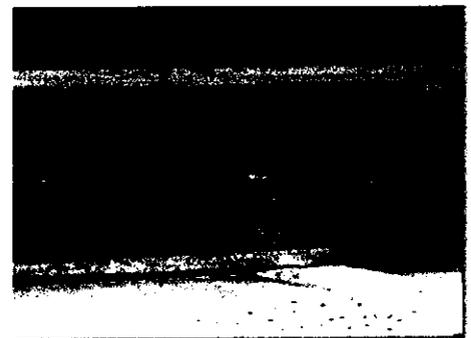
- Bats inhabited an average of 60 percent of all reported bat houses (both good and bad houses and installations) in BCI's 1999 to 2001 annual surveys.
- Occupancy in rural areas was 61 percent, compared to 50 percent for urban and suburban areas.
- 90 percent of occupied bat houses were used within two years (with 50 percent occupancy in the first year). The rest needed three to five years for bats to move in.
- Tall designs like the multi-chamber (nursery) and rocket-style houses performed best in our surveys. For example, 80 percent of 123 houses with chambers at least 25 inches tall were occupied in 2000.

**ATTRACTING BATS** – Bats have to find new roosts on their own. Existing evidence strongly suggests that lures or attractants (including bat guano) will *NOT* attract bats to a bat house. Bats investigate new roosting opportunities while foraging at night, and they are expert at detecting crevices, cracks, nooks and crannies that offer shelter from the elements and predators. Bat houses installed on buildings or poles are easier for bats to locate, have greater occupancy rates and are occupied two and a half times faster than those mounted on trees.

Unlike domestic animals, bats are wild and free-ranging. It is usually illegal to buy or sell them, and permits to capture and possess bats are generally limited to researchers, zoos, wildlife rehabilitators and educational organizations. Catching and relocating bats to new areas is, in any case, highly unlikely to succeed. Bats have strong homing instincts, and once released into a bat house, will attempt to return to their former home area. Consequently, placing bats in a bat house is usually futile and is not recommended. If a bat house remains unoccupied after two full years, consider repositioning or modifying the house.

**TEMPERATURES** – Maintaining proper roost temperatures is probably the single most important factor for a successful bat house. Interior temperatures should be warm and as stable as possible (ideally 80° F to 100° F in summer) for mother bats to raise their young. Some species, such as the big brown bat, prefer temperatures below 95° F, while others, such as the little brown bat, tolerate temperatures in excess of 100° F. Bachelor bats are less picky and may use houses with cooler temperatures. The sides of wooden or masonry structure are the best mounting sites, especially in colder climates, because temperatures are more stable than for houses attached to poles.

Bat house temperatures are influenced directly by the exterior color, compass orientation (east-, southeast-, or south-facing are generally good bets for single houses in most climates), the amount of sun exposure, how well the house is caulked and vented, and the mounting and construction materials. You may have to experiment to get the right placement and temperature range. You can always use a thermometer taped to a pole to see if temperatures are suitable inside the bat house (check the chambers high and low, and front and back).



**INSTALLATION SITES** – Pick installation sites with care so you don't have to move it after it is occupied. Most bat houses have open bottoms, which keeps guano from accumulating inside. Guano will, however, end up on the ground underneath, so avoid placing bat houses directly above windows, doors, decks or walkways. Bat urine may stain some finishes. Two- or four-inch spacers between a bat house and the wall, a large backboard or a longer landing area below a bat house may reduce guano deposits on the wall. A potted plant or a shallow tray or plant saucer can be placed underneath a bat house to collect bat guano for use as fertilizer in flower beds or gardens. Do not use a bucket or deep container (unless 1/4-inch or smaller mesh covers the entire top of the container), as any baby bats that fall from the bat house could become trapped inside.

**MAINTAINING YOUR BAT HOUSE** – Once you have attracted bats, you must maintain the bat houses to keep bats coming back year after year. Wasp and mud dauber nests should be cleaned out each winter after bats and wasps have departed. New caulk and paint or stain may be required after three to five years to guard against leaks and drafts. Bat houses should be monitored at least once a month (preferably more often) to detect potential problems such as predators, overheating, wood deterioration, etc. Any repairs or cleaning should be performed when bats are not present.

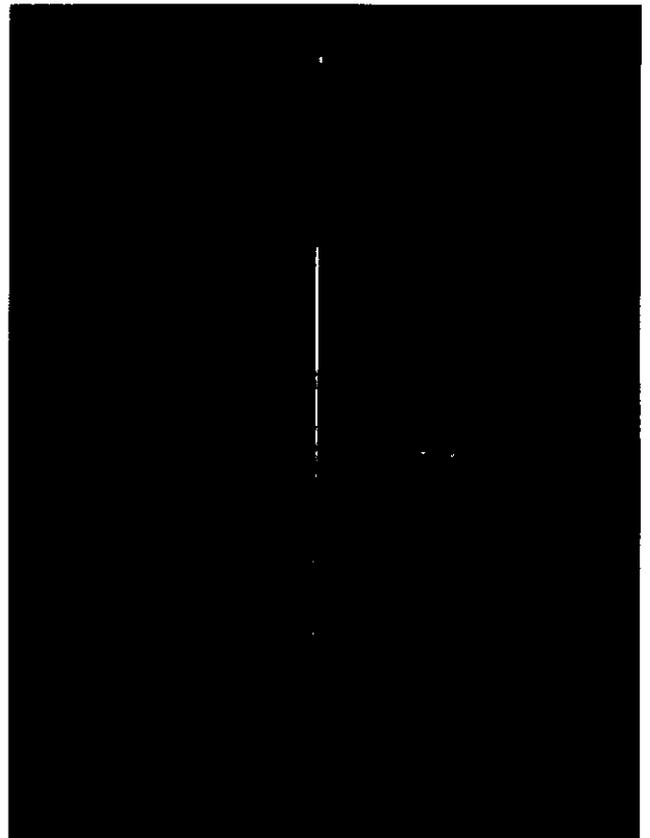
We wish you the best of luck with your bat houses.

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## Bat House Success Tips

- Line the vertical partitions with fiberglass insect (or window) screening, a material bats find especially easy to cling to.
- Most of America's crevice-roosting bats prefer crevice widths of 3/4 to 1-1/2 inches when using open-bottomed houses.
- The higher a bat house is located, the greater the occupancy success. Mounting houses on poles can help accommodate bat preferences for roosts 15 to 20 feet or higher and offers ideal opportunities to take advantage of solar heating, especially in northern areas.
- The most successful bat house builders we surveyed erected their houses in groups of three or more.
- Wrap the support pole three five from ground with an 18 radius disc to make an inverted meal cone to prevent ground predators form climbing pole.



# **Bat Houses and Wasps**

*By Mark Kiser*

One of the most common maintenance problems for bat house owners is caused by mud daubers and paper wasps. These wasps are beneficial, and bats will coexist with them in bat houses, but they can pose problems if they become too numerous. In extreme cases, wasps may prevent bats from occupying a bat house or force them to abandon one. Routine inspection of your bat house is recommended to ensure no serious problem develops. Using 3/4 -inch roosting chambers will help reduce occupation by wasps.

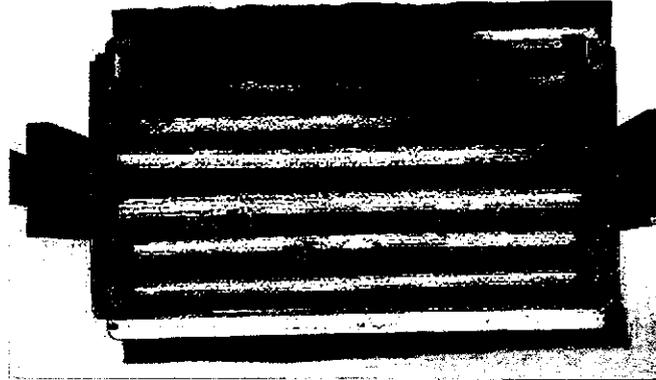
As the name implies, mud daubers use mud to build nests that resemble long tubes. Mud daubers are solitary hunting wasps (family Sphecidae) that build nests on or in buildings, under bridges, in crevices, or on rock faces. Nests contain eggs along with paralyzed insects and spiders on which the developing larvae feed. Left unchecked, mud daubers can fill virtually all of the roosting space in a bat house with nests, leaving little room for bats.

Mud daubers typically are not aggressive but may sting if provoked. To avoid injuring bats, or being stung, wait until after all bats have left for the season or for the evening (make sure no pups are present), to begin cleaning. Dried nests are easily broken up with a yardstick or similar long, thin object. Wear goggles to prevent falling debris from getting in your eyes, and thoroughly scrape out all nest material. Cleaning at least once a year, or more often if mud daubers are especially persistent, is the best way to keep wasps from outnumbering your bats. The following story is a good example of the importance of regular inspection and cleaning.

In 1997, Carol and Baxter Adams had 200 free-tailed bats in their back-to-back pair of nursery houses. In June 1998, however, they noticed few bats using the houses. We inspected the houses and observed that the roosting chambers had become so clogged with mud dauber nests that only five bats remained. After dark, when the bats were gone, we removed all of the nests with a yardstick. By the next morning, to our surprise, 50 bats had already returned. The following day 50 to 100 bats were back, and there were more than 350 just one month later. By this time, there was little room for mud daubers to return.

Paper or red wasps (family Vespidae, the social wasps) use a mixture of wood pulp and saliva to construct nests, which hang from a stem-like pillar. In bat houses, nests are typically built at the top of the roosting chambers, especially where a gap is left between the roof or ceiling and the partitions. When bats and wasps occupy bat houses at the same time, they may segregate into separate roosting chambers, as bats can be killed by wasp stings. Honorary Research Associate Cal Butchkoski reports that when using the same chamber, bats may leave "travel lanes" open for wasps to come and go.

To prevent wasps from building nests at the top of the roosting chambers, extend the partitions all the way to the ceiling or roof, so wasps will not have space to build nests. Nests can be knocked down using the same method described above. However, because paper wasps are more aggressive, cleaning is best done in winter, when the colony has died off. Use this opportunity to inspect your houses for other maintenance problems, such as loose boards or mounting hardware, and deteriorated caulk or paint.



*Wasps and mud daubers may prevent bats from using a bat house.  
After the nests were cleaned out of this pair of houses  
(which had been almost completely blocked off)  
the number of bats rebounded from five to more than 350.*



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## Criteria for Successful Bat Houses

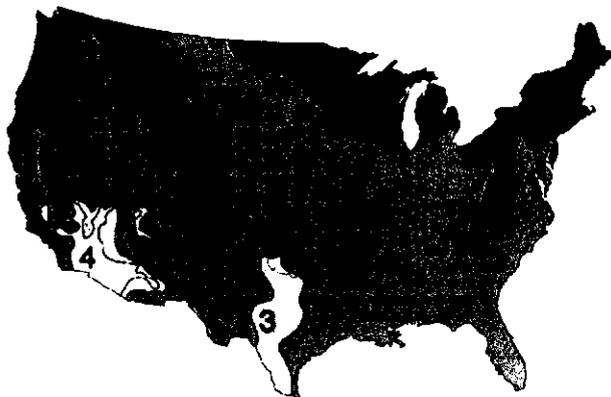
Whether you build or buy a bat house, make sure the dimensions meet the criteria below. Following these construction and installation guidelines will greatly increase your odds of attracting bats. These recommendations are based on 12 years of bat-house research conducted across the U.S, Canada and the Caribbean. Small, poorly made houses commonly sold in stores or any house improperly installed are likely to fail. Much more information is available on BCI's website: [www.batcon.org](http://www.batcon.org).

**1. DESIGN:** All bat houses should be at least 2 feet tall, have chambers at least 20 inches tall and 14 inches wide, and have a landing area extending below the entrance at least 3 to 6 inches (some houses feature recessed partitions that offer landing space inside). Taller and wider houses are even better. Rocket boxes should be at least 3 feet tall and have at least 12 inches of linear roost space. Most bat houses have one to four roosting chambers – the more the better. Roost partitions should be carefully spaced 3/4 to 1 inch apart. All partitions and landing areas should be roughened. Wood surfaces can be scratched or grooved horizontally, at roughly 1/4- to 1/2-inch intervals, or covered with durable, square plastic mesh (1/8- or 1/4-inch mesh).

Where average July high temperatures are 85° F or more, include vents approximately 6 inches from the bottom of all houses that are 24 to 32 inches tall. Front vents should be as long as a house is wide, side vents 6 inches tall by 1/2-inch wide. Houses 36 inches tall or more should have vents 10 to 12 inches from the bottom.

**2. CONSTRUCTION:** For wooden houses, a combination of exterior plywood (ACX, BCX or T1-11 grade) and cedar is best. Plywood for bat-house exteriors should be at least 1/2-inch thick with at least four plies. Do not use pressure-treated wood. Any screws, hardware or staples used must be exterior grade (galvanized, coated, stainless, etc). To increase longevity, use screws rather than nails. Caulk all seams, especially around the roof. Alternative materials, such as plastic or fiber-cement board, may last longer and require less maintenance.

**3. WOOD TREATMENT:** For the exterior, apply three coats of exterior grade, water-based paint or stain. Observations suggest that color should be black where average high temperatures in July are less than 85° F, dark colors (such as dark brown or dark gray) where they are 85° to 95° F, medium colors where they are 95° to 100° F and white or light colors where they exceed 100° F. Much depends upon amount of sun exposure; adjust to darker colors for less sun. For the interior, use two coats dark, exterior grade, water-based stain. Apply stain after creating scratches or grooves or prior to stapling plastic mesh. Paint fills grooves, making them unusable.



**Bat house color recommendations and average daily high temperatures in July**

Areas	Wooden houses	Plastic/Stucco houses
1) Dark areas:	black	dark color
2) Medium:	dark or medium color	medium color
3) Light:	medium color	light color
4) Lightest:	white or light color	light color

**4. SUN EXPOSURE:** Houses where high temperatures in July average 80° F or less, should receive at least 10 hours of sun, and more is better. At least six hours of direct daily sun is recommended for all bat houses where July's daily highs average less than 100° F. Full, all-day sun is often successful in all but the hottest climates. To create favorable conditions for maternity colonies in summer, internal bat-house temperatures should stay between 80° F and 100° F as long as possible.

**5. HABITAT:** Most nursery colonies of bats choose roosts within 1/4 mile of water, preferably a stream, river or lake. Greatest bat-house success has been achieved in areas of diverse habitat, especially where there is a mixture of varied agricultural use and natural vegetation. Bat houses are most likely to succeed in regions where bats are already attempting to live in buildings.

**6. MOUNTING:** Bat houses should be mounted on buildings or poles. Houses mounted on trees or metal siding are seldom used. Wood, brick or stone buildings with proper solar exposure are excellent choices, and houses mounted under eaves are often successful. Single-chamber houses work best when mounted on buildings. Mounting two bat houses back-to-back on poles (with one facing north and the other south) is ideal. Place houses 3/4-inch apart and cover both with a galvanized metal roof to protect the center roosting space from rain. All bat houses should be mounted at least 12 feet above ground, and 15 to 20 feet is better. Bat houses should not be lit by bright lights.

**7. PROTECTION FROM PREDATORS:** Houses mounted on the sides of buildings or on metal poles provide the best protection from predators. Metal predator guards may be helpful, especially on wooden poles. Bats may find bat houses more quickly if they are located along forest or water edges where bats tend to fly. However, they should be placed at least 20 to 25 feet from the nearest tree branches, wires or other potential perches for aerial predators.

**8. AVOIDING UNINVITED GUESTS:** Wasps can be a problem before bats fully occupy a house. Use of 3/4-inch roosting spaces reduces the risk of wasps. If nests accumulate, they should be removed in late winter or early spring before either wasps or bats return. Open-bottom houses greatly reduce problems with birds, mice, squirrels or parasites, and guano does not accumulate inside.

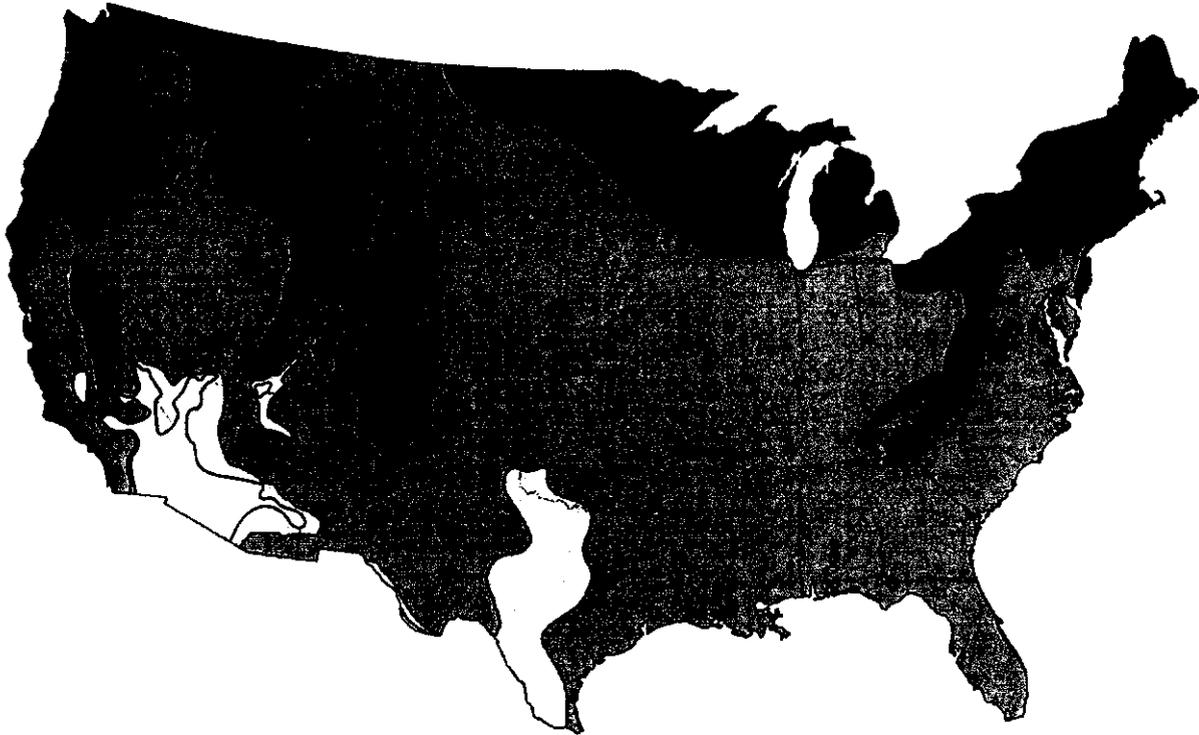
**9. TIMING:** Bat houses can be installed at any time of the year, but they are more likely to be used during their first summer if installed before the bats return in spring. When using bat houses in conjunction with excluding bats from a building, install the bat houses at least two to six weeks before the actual eviction, if possible.

**10. IMPORTANCE OF LOCAL EXPERIMENTATION:** It is best to test for local needs before putting up more than three to six houses. Compare houses of different colors or shades and sun exposure.

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## Bat House Color Recommendations and Average Daily High Temperatures in July



- 1. Dark areas: less than 85° F. – Black or dark shade of paint.    3. Light areas: 95°-100° F. – Medium or light shade of paint.*  
*2. Medium areas: 85°-95° F. – Dark or medium shade of paint.    4. Lightest areas: 100° F or greater. – White or light shade of paint.*

Years of research have shown that bat houses are far more successful at attracting bats if they are painted or stained. Painting helps provide the proper internal temperature for bats and also increases the life span of the bat house. Appropriate color depends upon geographic location and amount of sun exposure. At least six hours of direct daily sun are recommended for all bat houses where daily high temperatures in July average less than 100° F. Houses where high temperatures in July average 80° F or less should receive as much sunlight as possible. Adjust to darker colors for less sun. Use exterior-quality, water-based stain or latex paint, and choose flat paint rather than gloss or semi-gloss paint for best solar absorption.



# Facts on the Fly!

## ANSWERS TO QUESTIONS ABOUT BAT HOUSES

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**Will attracting bats to bat houses in my yard increase the likelihood that they will move into my attic or wall spaces?**

No. If bats liked your attic or wall spaces, they probably would already be living there.

**How many bats can potentially occupy my bat house?**

A single-chamber house can shelter 50 bats, while a larger multi-chamber design can attract colonies of 200 or more bats.

**How can I determine the likelihood of attracting bats?**

Throughout most of the United States and much of Canada there are occupied bat houses being used by one of North America's many crevice-dwelling bat species. Wherever bats live, they must find enough insects to eat, largely explaining their preference for roosting near aquatic habitats. The closer you live to cave or mine hibernating sites the better, and the existence of bat colonies in nearby buildings and bridges also increases your chances.

**Why might bats not be attracted to my bat house?**

The most frequent cause of failure is inappropriate exposure to solar heating. Alternatively, bats may not be able to live in your area due to heavy pesticide use, inadequate food supply or lack of available caves and mines within 50 to 100 miles (80 to 160 km). So far, we are unaware of large areas of North America (except for hot desert lowlands) that cannot attract bats.

**If I have bats living in my attic, but would prefer that they occupy a bat house, what should I do?**

Attics and other parts of buildings often provide ideal bat roosting sites. In most cases, bats will not voluntarily move from an attic. In such cases, alternative roosts ideally should be provided several months or one season before the desired move. The bats should be evicted from the attic at a time in the early spring or fall when flightless young are not present. Eviction is often easily accomplished. Watch to see where the bats emerge at dusk. Using  $\frac{1}{8}$ " (4 mm) or smaller plastic mesh, bird

netting or clear, heavy plastic, hang a large enough piece over the emergence point, extending a foot (30 cm) below and to each side of the exit. Secure the net in place so that it hangs free an inch (25 mm) or so away from the building. It will act as a one-way valve, permitting exit, but closing when bats land on it to return. For more information about bat eviction, please refer to the Bats in Buildings section of BCI's website ([www.batcon.org](http://www.batcon.org)).

**How effective are bats in controlling insects?**

As primary predators of night-flying insects, bats play a key role in the balance of nature, consuming vast quantities of insects, many of which are costly agricultural and yard pests. Furthermore, many insects avoid areas where they hear bats.

**Will having bat houses in my yard interfere with attracting birds?**

No. They rarely compete for food or space.

**Will bat droppings pose a threat to my family?**

No more so than bird or cat droppings would. You should avoid inhalation of dust associated with animal feces of any kind.

**What are the chances that a sick bat will endanger my family with rabies?**

Only 14 people in more than 50 years have contracted rabies from North American bat species that commonly live in bat houses. Like all mammals, bats can contract rabies, although very few do. Unlike many other animals, even rabid bats rarely become aggressive. They quickly die from the disease, and outbreaks in their colonies are extremely rare. The odds of being harmed by a rabid bat are remote if you simply do not attempt to handle bats. Any bat that can be easily caught should be assumed to be sick and left alone. We do not recommend attracting bats to places where curious children are likely to attempt handling them. With or without bats in your yard, the most important action you can take to protect your family from rabies is to vaccinate your family dogs and cats.

## CRITERIA FOR SUCCESSFUL BAT HOUSES

**1. Design.** All bat houses should be at least 2 feet tall (61 cm), have chambers at least 14 inches (36 cm) wide, and have a landing area extending below the entrance at least 3 to 6 inches (8 to 15 cm) (some houses feature recessed partitions that offer landing space inside). Taller and wider houses are even better. Rocket boxes should be at least 3 feet (91 cm) tall and have at least 12 inches (30 cm) of linear roost space. Most bat houses have one to four roosting chambers—the more the better. Roost partitions should be carefully spaced  $\frac{3}{8}$  to 1 inch (19 to 25 mm) apart. All partitions and landing areas should be roughened. Wood surfaces can be scratched or grooved horizontally, at roughly  $\frac{1}{8}$ - to  $\frac{1}{2}$ -inch (6 to 13 mm) intervals, or covered with durable square, plastic mesh [ $\frac{1}{8}$ - or  $\frac{1}{4}$ -inch (3 to 6 mm) mesh]. Include vents approximately 6 inches (15 cm) from the bottom of all houses 24 to 32 inches (61 to 81 cm) tall where average July high temperatures are 85°F (30°C) or above. Front vents are as long as a house is wide; side vents 6 inches (15 cm) tall by  $\frac{1}{2}$  inch (13 mm) wide. Houses 36 inches (91 cm) or taller should have vents approximately 10 to 12 inches (25 to 30 cm) from the bottom.

**2. Construction.** For wooden houses, a combination of exterior plywood (ACX, BCX or T1-11 grade) and cedar is best. Plywood for exteriors should be  $\frac{1}{2}$ -inch (13 mm) thick or greater and have at least four plies. Do not use pressure-treated wood. Any screws, hardware or staples used must be exterior grade (galvanized, coated, stainless etc.). To increase longevity, use screws rather than nails. Caulk all seams, especially around the roof. Alternative materials, such as plastic or fiber-cement board, may last longer and require less maintenance.

**3. Wood Treatment.** For the exterior, apply three coats of exterior grade, water-based paint or stain. Available observations suggest that color should be black where average high temperatures in July are less than 85°F (30°C), dark colors (such as dark brown or dark gray) where they are 85° to 95°F (30° to 35°C), medium colors where they are 95° to 100°F (35° to 38°C) and white or light colors where they exceed 100°F (38°C). Much depends upon amount of sun exposure; adjust to darker colors for less sun. For the interior, use two coats dark, exterior grade, water-based stain. Apply stain after creating scratches or grooves, or prior to stapling plastic mesh. Paint fills grooves, making them unusable.

**4. Sun Exposure.** Houses where high temperatures in July average 80°F (27°C) or less should receive at least 10 hours of sun. At least six hours of direct daily sun are recommended for

all bat houses where daily high temperatures in July average less than 100°F (38°C). Full sun is often successful in all but the hottest climates. For maternity colonies in summer, internal bat house temperatures should stay between 80° and 100°F (27° and 38°C) as long as possible.

**5. Habitat.** Most nursery colonies choose roosts within  $\frac{1}{4}$  mile (400 m) of water, preferably a river or lake. Greatest bat house success has been achieved in areas of diverse habitat, especially where there is a mixture of varied agricultural use and natural vegetation. Bat houses are most likely to succeed in regions where bats are already attempting to live in buildings.

**6. Mounting.** Bat houses should be mounted on buildings or poles. Houses mounted on trees or metal siding are seldom used. Wooden, brick or stone buildings with proper solar exposure are excellent choices, and locations under the eaves often are successful. Single-chamber houses work best when mounted on buildings. Mounting two bat houses back to back on poles is ideal (face one house north, the other south). Place houses  $\frac{3}{4}$  inch (19 mm) apart and cover both with a galvanized metal roof to protect the center roosting space from rain. All bat houses should be mounted at least 12 feet (4 m) above ground; 15 to 20 feet (5 to 6 m) is better. Bat houses should not be lit by bright lights.

**7. Protection from Predators.** Houses mounted on sides of buildings or on metal poles provide the best protection from predators. Metal predator guards may be helpful, especially on wooden poles. Bat houses may be found more quickly if located along forest or water edges where bats tend to fly, but they should be placed at least 20 feet (6 m) from the nearest tree branches, wires or other perches for aerial predators.

**8. Avoiding Uninvited Guests.** Wasps can be a problem before bats fully occupy a house. Use of  $\frac{3}{8}$ -inch (19 mm) chambers reduces wasp problems. Wasp nests should be removed in late winter or early spring before either wasps or bats return. Open-bottom houses greatly reduce problems with birds, rodents or parasites, and guano does not build up inside.

**9. Timing.** Bat houses can be installed at any time of the year, but they are more likely to be used during their first summer if installed before the bats return in spring. When using bat houses in conjunction with excluding a colony from a building, install the bat houses at least two to six weeks before the actual eviction, if possible.

*To order The Bat House Builder's Handbook, Building Homes for Bats video or ready-made bat houses, visit Bat Conservation International's online catalog at: [www.batcatalog.org](http://www.batcatalog.org).*

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# Installing Your Bat House

## - Wooden Post or Steel Pole Installation-

Choose a sunny location to install your bat house pole. Bat houses work best with at least 6-8 hours of direct sunlight (if only partial day sun is available- morning sun is preferable). Bat houses should not be lit by bright lights. This is one reason installing them on existing light or utility poles is a bad idea.

Bats may find bat houses more quickly if they are located along forest or water edges where bats tend to fly. However, they should be placed at least 20 to 25 feet from the nearest tree branches, wires or other potential perches for aerial predators

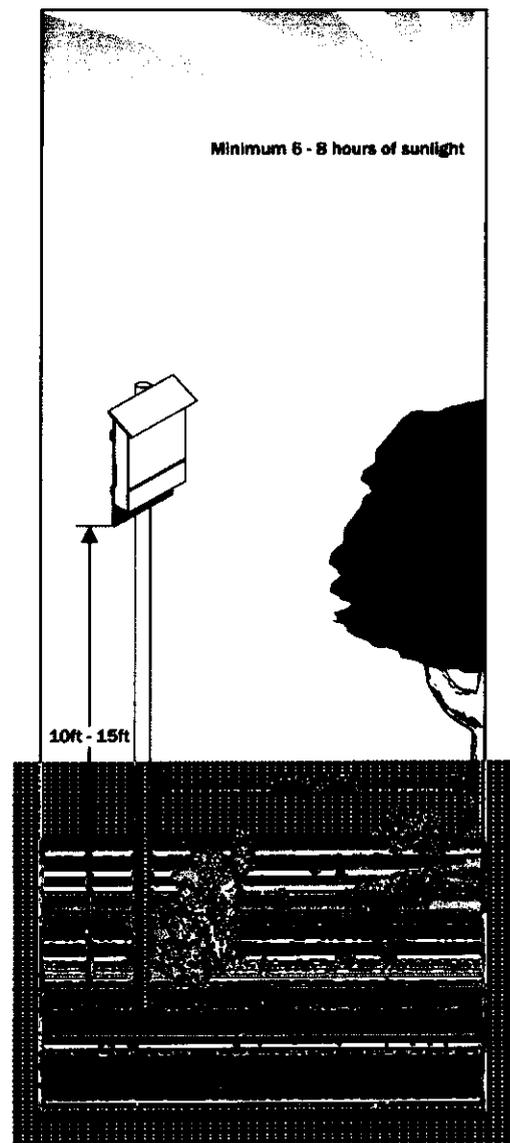
Most nursery colonies of bats choose roosts within 1/4 mile of water, preferably a stream, river or lake. Greatest bat-house success has been achieved in areas of diverse habitat, especially where there is a mixture of varied agricultural use and natural vegetation.

Single-chambered bat houses do not work well installed on poles. Since larger bat houses are more thermally stable, use only multi-chambered bat houses at least 14 inches wide and 20 inches tall on posts. All bat houses should be mounted at least 10 feet above ground, and 12 to 20 feet is better. Metal predator guards may be helpful, especially on wooden posts.

Bat houses can be installed at any time of the year, but they are more likely to be used during their first summer if installed before the bats return in spring. If you are excluding bats from a nearby building, install the bat houses at least two to six weeks before the evicting the bats.

It is best to test for local needs before putting up more than three to six houses. Compare houses of different colors or shades and sun exposure.

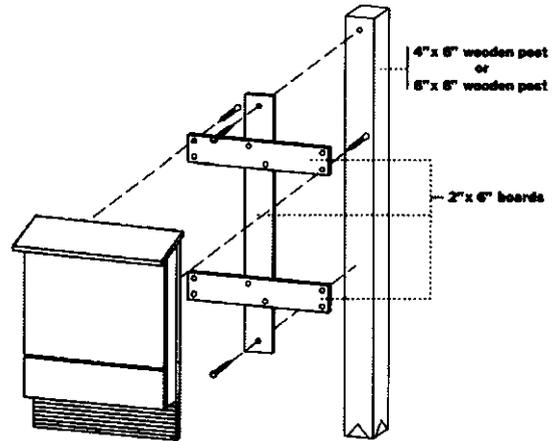
**Be sure to use a schedule-40 galvanized steel pole with the inside diameter 2" or greater OR a 4"x6" treated wooden post. A local fencing supply company is the best place to purchase poles and posts.**



## SINGLE BAT HOUSE ON A WOODEN POST (Single Post Mount)

### You Will Need:

4x6 pressure treated wooden post (at least 16' )  
Pea gravel  
2"x4" boards  
    2 cut to width of bat house  
    1 cut to at least 6" longer than bat house  
1 5/8" exterior grade screws  
3" exterior grade screws  
3/32" bit (to pre-drill screw holes)  
6" lag bolts, hex bolts, or carriage bolts  
Drill bit sized for bolts  
Wrenches to fit bolts  
Exterior grade adhesive caulk (optional)  
Wood clamps or spring clamps  
Tape measure, Pencil, Electric Drill  
Post hole digger  
Tamp stick



### Instructions:

- \* Multi-chambered houses only
- \* Make sure there are no underground wires, pipes or cables – you'll be digging about 3 feet down.
- \* Wooden posts tend to rot when set directly in concrete or cement. Use pea gravel.

1) Cut each 2"x4" board to the width of your bat house.

2) Measure and drill pilot holes to ensure screws will attach securely to the bat house frame and do not protrude inside the bat house roosting crevices. The bat house frame typically extends down the sides and along the top 1 1/2".

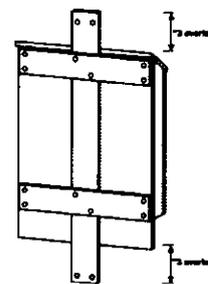
3) Apply adhesive caulk (optional) between the boards and the bat house and attach the boards to the bat house using 1 5/8" screws. You may want to clamp the boards prior to drilling to ensure they stay in place.

4) Cut the vertical mounting board six inches longer than the bat house. Center the board on top of the horizontal mounting boards so the ends of the board extend at least 3 inches above and below the bat house. Secure the vertical board to the horizontal boards with 3" screws. Make sure the screws do not protrude into the roosting chambers.

5) Pre-drill holes at the top and bottom of the vertical mounting board, and secure the bat house to post with lag screws, hex bolts, or carriage bolts.

6) For poles up to 16 feet, use a post-hole digger (or auger) to dig a hole about 34" and about twice the width of the post. Add an additional 2" of depth for each additional foot of post beyond 16 feet. Tamp the bottom of the hole to make sure it is level.

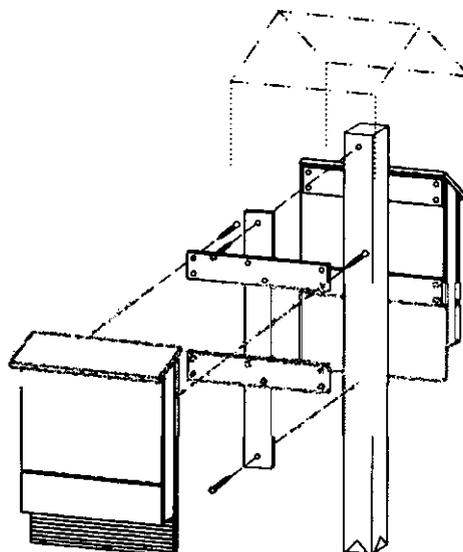
7) Set the post in the ground and orient it to face the bat house in proper direction (generally south or southeast). Brace the post if needed with scrap wood to ensure it remains straight. Fill the hole with pea gravel, tamping firmly after each three-inch layer of gravel.



## TWO BAT HOUSES ON A WOODEN POST (Single Post Mount)

### You Will Need:

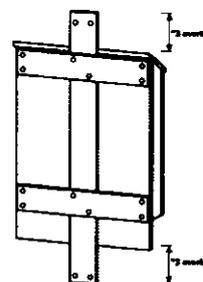
- 4"x6" pressure treated wooden post (at least 16')
- Pea gravel
- 2"x4" boards
  - 4 boards cut to width of bat house(s)
  - 2 boards cut to at least 6" longer than bat house(s)
- 1 5/8" exterior grade screws
- 3" exterior grade screws
- 3/32" bit (to pre-drill screw holes)
- 8" lag bolts, hex bolts, or carriage bolts
- Drill bit sized for bolts
- Wrenches to fit bolts
- Exterior grade adhesive caulk (optional)
- Wood clamps or spring clamps
- Tape measure, Pencil, Electric Drill
- Post hole digger
- Tamp stick



### Instructions:

- \* Multi-chambered houses only
- \* Make sure there are no underground wires, pipes or cables – you'll be digging about 3 feet down.
- \* Wooden posts tend to rot when set directly in concrete or cement. Use pea gravel instead.
- \* Mounting two bat houses back-to-back on poles (with one facing north and the other south) is ideal. Cover both with a galvanized metal roof to protect bat houses and allow bats the option of roosting between them out of the rain.

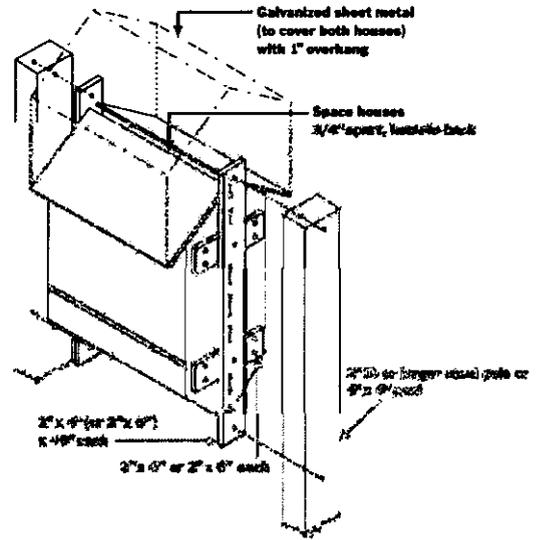
- 1) Cut four 2"x4" boards to the width of your bat houses (2 for each house).
- 2) Measure and drill pilot holes to ensure screws will attach securely to the bat house frame and do not protrude inside the bat house roosting crevices. The bat house frame typically extends down the sides and along the top 1 1/2".
- 3) Apply adhesive caulk (optional) between the boards and the bat house and attach the boards to the bat house using 1 5/8" screws. You may want to clamp the boards prior to drilling to ensure they stay in place.
- 4) Cut the vertical mounting boards (one for each house) six inches longer than the bat house. Center the board on top of the horizontal mounting boards so the ends of the board extend at least 3 inches above and below the bat house. Secure the vertical board to the horizontal boards with 3" screws. Make sure the screws do not protrude into the roosting chambers.
- 5) Pre-drill holes at the top and bottom of the vertical mounting boards, and secure the bat houses to the post with lag screws, hex bolts, or carriage bolts.
- 6) For poles up to 16 feet, use a post-hole digger (or auger) to dig two holes about 34" and about twice the width of the posts. Add an additional 2" of depth for each additional foot of post beyond 16 feet. Tamp the bottom of the holes to make sure each one is level. Measure carefully to ensure they are the same depth.
- 7) Set the posts in the ground and orient them to face the bat house in proper direction (generally south or southeast). Brace the posts if needed with scrap wood to ensure it remains straight. Fill the holes with pea gravel, tamping firmly after each three-inch layer of gravel.



## TWO BAT HOUSES ON A WOODEN POST (Double Post Mount)

### You Will Need:

- 2 4"x6" pressure treated wooden posts (at least 16')
- Pea gravel
- 2"x4" or 2"x6" boards
  - 4 boards cut to depth of both bat houses + 3/4"
  - 2 boards cut to at least 6" longer than bat houses
- 1 5/8" exterior grade screws
- 3" exterior grade screws
- 3/32" bit (to pre-drill screw holes)
- 8" lag bolts, hex bolts, or carriage bolts
- Drill bit sized for bolts
- Wrenches to fit bolts
- Exterior grade adhesive caulk (optional)
- Wood clamps or spring clamps
- Tape measure, Pencil, Electric Drill
- Post hole digger
- Tamp stick



### Instructions:

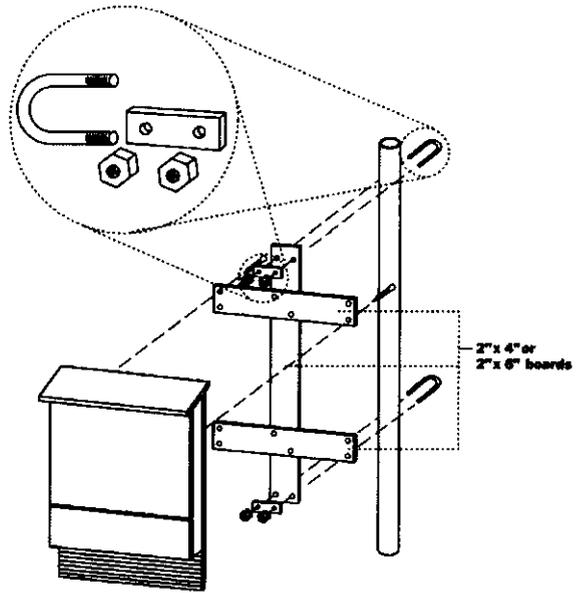
- \* Multi-chambered houses only
- \* Make sure there are no underground wires, pipes or cables – you'll be digging about 3 feet down.
- \* Wooden posts tend to rot when set directly in concrete or cement. Use pea gravel instead.
- \* Mounting two bat houses back-to-back on poles (with one facing north and the other south) is ideal. Place houses 3/4 inch apart and cover both with a galvanized metal roof to protect the center roosting space from rain.

- 1) Cut four 2"x4" boards a length that equals the depth of both bat houses plus 3/4". These will attach the bat houses to each other with a 3/4" gap between.
- 2) Measure and drill pilot holes to ensure screws will attach securely to the bat house frame and do not protrude inside the bat house roosting crevices. The bat house frame typically extends down the sides and along the top 1 1/2".
- 3) Apply adhesive caulk (optional) between the boards and the bat house and attach the boards to the bat house using 1 5/8" screws. You may want to clamp the boards prior to drilling to ensure they stay in place.
- 4) Cut the vertical mounting boards (one on each side) six inches longer than the bat house. Center the board on top of the horizontal mounting boards so the ends of the board extend at least 3 inches above and below the bat house. Secure the vertical board to the horizontal boards with 3" screws. Make sure the screws do not protrude into the roosting chambers.
- 5) Pre-drill holes at the top and bottom of the vertical mounting boards, and secure the bat houses to the post with lag screws, hex bolts, or carriage bolts.
- 6) For poles up to 16 feet, use a post-hole digger (or auger) to dig a hole about 34" and about twice the width of the post. Add an additional 2" of depth for each additional foot of post beyond 16 feet. Tamp the bottom of the hole to make sure it is level.
- 7) Set the post in the ground and orient it to face the bat house in proper direction (generally south or southeast). Brace the post if needed with scrap wood to ensure it remains straight. Fill the hole with pea gravel, tamping firmly after each three-inch layer of gravel.

## SINGLE BAT HOUSE ON A STEEL POLE (U-bolts)

### You Will Need:

Galvanized steel pole (16' or longer)  
Schedule 40; 2" ID (2 3/8" OD) or larger  
Concrete or Cement  
2"x4" or 2"x6" boards  
2 cut to width of bat house  
1 cut to at least 6" longer than bat house  
1 5/8" exterior grade screws  
3" exterior grade screws  
3/32" bit (to pre-drill screw holes)  
U-bolt to fit steel pole (for 2" pipe or larger)  
Wrenches to fit U-bolt nuts  
Exterior grade adhesive caulk (optional)  
Wood clamps or spring clamps  
Tape measure, Pencil, Electric Drill  
Post hole digger  
Tamp stick



### Instructions:

\* Multi-chambered houses only

\* Make sure there are no underground wires, pipes or cables – you'll be digging about 3 feet down.

1) Cut each 2"x4" board to the width of your bat house.

2) Measure and drill pilot holes to ensure screws will attach securely to the bat house frame and do not protrude inside the bat house roosting crevices. The bat house frame typically extends down the sides and along the top 1 1/2".

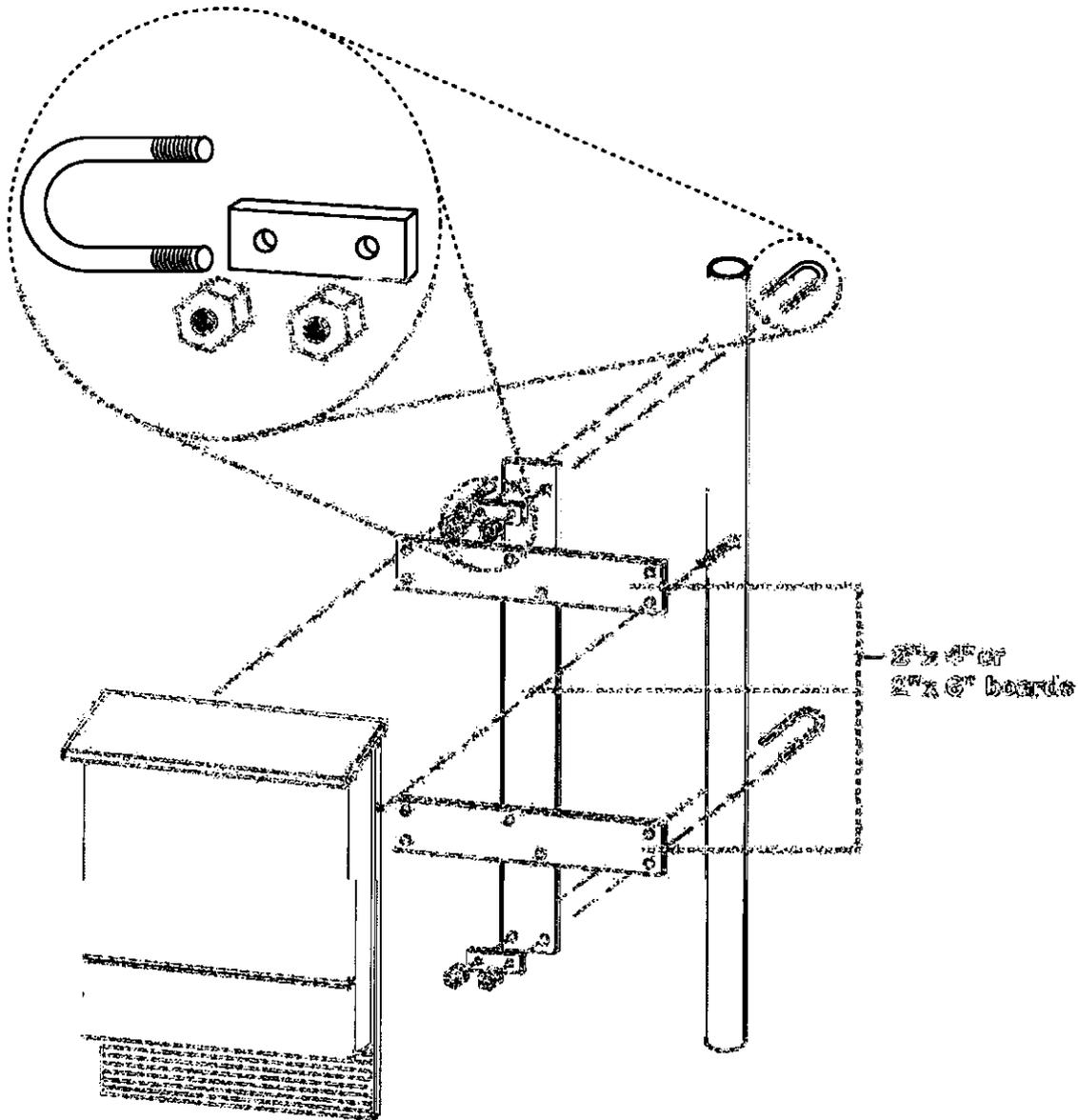
3) Apply adhesive caulk (optional) between the boards and the bat house and attach the boards to the bat house using 1 5/8" screws. You may want to clamp the boards prior to drilling to ensure they stay in place.

4) Cut the vertical mounting board six inches longer than the bat house. Center the board on top of the horizontal mounting boards so the ends of the board extend at least 3 inches above and below the bat house. Secure the vertical board to the horizontal boards with 3" screws. Make sure the screws do not protrude into the roosting chambers.

5) Pre-drill holes at the top and bottom of the vertical mounting board, and secure the bat house to post with the U-bolts.

6) For poles up to 16 feet, use a post-hole digger (or auger) to dig a hole about 34" and about twice the width of the post. Add an additional 2" of depth for each additional foot of post beyond 16 feet. Tamp the bottom of the hole to make sure it is level.

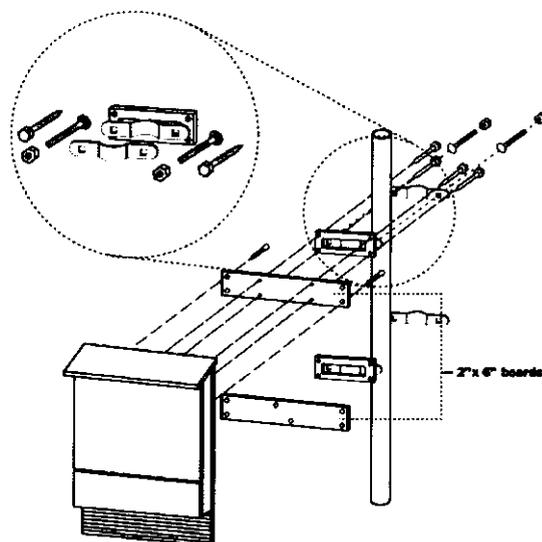
7) Set the post in the ground and orient it to face the bat house in proper direction (generally south or southeast). Brace the post if needed with scrap wood to ensure it remains straight. Fill the hole with the original soil, tamping firmly after each three-inch layer of soil. Fill the entire hole, then cut a square in the ground approximately 6" deep and 3' by 3' square. Frame with wood if desired. Fill this with concrete or cement to create a base. Pouring a cement pad around the base of the pole provides more stability and is easier to remove than setting the entire post base in cement. An added benefit is that you can easily collect the guano for gardening as it accumulates on the pad.



## SINGLE BAT HOUSE ON A STEEL POLE (Steel to Wood Adapter)

### You Will Need:

- Galvanized steel pole (16' or longer)
  - Schedule 40; 2" ID (2 3/8" OD) or larger
- Concrete or Cement
- 2"x4" or 2"x6" boards
  - 2 cut to width of bat house
  - 1 cut to at least 6" longer than bat house
- 1 5/8" exterior grade screws
- 3" exterior grade screws
- 1/4" x 1 1/2" exterior grade lag screws
- 3/32" bit (to pre-drill screw holes)
- 2 3/8 inch steel to wood adapter
  - (found in chain link section of the hardware store – different adapter designs exist – *Home Depot* version shown)
- Wrenches to fit bracket nuts
- Exterior grade adhesive caulk (optional)
- Wood clamps or spring clamps
- Tape measurer, Pencil, Electric Drill
- Post hole digger
- Tamp stick



### Instructions:

- \* Multi-chambered houses only
- \* Make sure there are no underground wires, pipes or cables – you'll be digging about 3 feet down.

1) Cut each 2"x4" board to the width of your bat house.

2) Measure and drill pilot holes to ensure screws will attach securely to the bat house frame and do not protrude inside the bat house roosting crevices. The bat house frame typically extends down the sides and along the top 1 1/2".

3) Apply adhesive caulk (optional) between the boards and the bat house and attach the boards to the bat house using 1 5/8" screws. You may want to clamp the boards prior to drilling to ensure they stay in place.

4) Drill pilot holes and secure the brackets to the horizontal mounting boards with 1 1/2" lag screws. Make sure the screws do not protrude into the roosting chambers.

5) Secure the bat house to post with the brackets.

6) For poles up to 16 feet, use a post-hole digger (or auger) to dig a hole about 34" and about twice the width of the post. Add an additional 2" of depth for each additional foot of post beyond 16 feet. Tamp the bottom of the hole to make sure it is level.

7) Set the post in the ground and orient it to face the bat house in proper direction (generally south or southeast). Brace the post if needed with scrap wood to ensure it remains straight. Fill the hole with the original soil, tamping firmly after each three-inch layer of soil. Fill the entire hole, then cut a square in the ground approximately 6" deep and 3' by 3' square. Frame with wood if desired. Fill this with concrete or cement to create a base. Pouring a cement pad around the base of the pole provides more stability and is easier to remove than setting the entire post base in cement. An added benefit is that you can easily collect the guano for gardening as it accumulates on the pad.

