Constructing and Installing Bat Houses in Connecticut

Why bats matter and how we can help them


Photo: Jamie Masthay


Photo: The Bird House


Photo: Jamie Masthay

Natural Resources Conservation Academy

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Why Bats Matter

and fun facts

Big Brown Bat

This guide aims to **raise awareness about the importance and benefits of bats in Connecticut**, to provide information about threats to CT bats such as White Nose Syndrome (WNS), and to **explain the importance and purpose of bat houses** around the world.

We will also detail **how to construct a bat house** – giving step-by-step instructions and a number of pictures taken at various stages of construction – and will give **guidelines on installing a bat house**.

Contact information in case of questions is included at the end of this pamphlet.

Bat Facts

- Bats make up 25% of the more than 5,400 mammal species worldwide; however, **only 8 bat species are native to Connecticut.**[1]
- Bats worldwide have varied diets, from flower nectar to frogs and fish. **All CT bats eat insects**.[1]
- A single little brown bat can **eat up to 1000 mosquitoes per hour**.[1]
- Only **3 species of bats actually drink blood**, and they prefer other animal blood over human blood. None of them are present in the United States.[2]
- Bats save the corn-growing industry alone **more than 1 billion dollars in pest control annually** through the number of insects they eat.[3]
- **Less than 1% of all bats carry rabies**, infecting 1 or 2 people in the United States annually. You cannot get rabies from just being near a bat, and there are few cases of bats infecting pets or livestock.[4]
- Bats are actually **very clean animals**; when they are not eating or sleeping, they are usually grooming themselves.[1]
- Bats **do not get caught in people's hair**; they are skilled at dodging obstacles (including people) with a technique known as echolocation, and will only come near a person to catch nearby insects.[4]

Meet CT's Bats


Photo: TX Parks & Wildlife Dept.

Big Brown Bat
(*Eptesicus fuscus)*
- Very common
- Hibernates/cave roosts
- 3.8 – 4.5 inches
- 1-2 pups/year[5]
- Not threatened


Photo: Reddit.com

Little Brown Bat
(*Myotis lucifugus*)
- Rare but once common
- Hibernates/cave roosts
- 3.1 – 3.7 inches
- 1 pup/year[6]
- Endangered (state)


Photo: SC Dept. of Natural Resources

Northern Long-Eared Bat
(*Myotis septentrionalis*)
- Very rare
- Hibernates/cave roosts
- 3.0 – 3.7 inches
- 1 pup/year[7]
- Endangered (federally)


Photo: Justin Boyles

Indiana Bat
(*Myotis sodalis*)
- Very rare
- Hibernates/cave roosts
- 2.8 – 3.5 inches
- 1 pup/year[8]
- Endangered (federally)


Photo: Alaska Dept. of Fish and Game

Silver-Haired Bat
(*Lasionycteris noctivagans*)
- Seasonally common
- Migrates/tree roosts
- 3.7 – 4.4 inches
- 1-2 pups/year[9]
- Special concern (state)


Photo: University of Colorado

Hoary Bat
(*Lasiurus cinereus*)
- Seasonally common
- Migrates/tree roosts
- 5.2 – 5.7 inches
- Up to 3-4 pups/year[10]
- Special concern (state)


Photo: Texas AgriLife Extension

Eastern Red Bat
(*Lasiurus borealis*)
- Seasonally common
- Migrates/tree roosts
- 3.7 – 4.4 inches
- 2-4 pups/year[11]
- Special concern (state)


Photo: Bat Removal Pro

Tri-Colored Bat
(*Perimyotis subflavus*)
- Very rare
- Hibernates/cave roosts
- 3.1 – 3.5 inches
- 2 pups/year[12]
- Endangered (state)

All Connecticut bats are **aerial insectivores**, which means they **catch and eat insects while flying** (though the hoary bat will sometimes also prey on other bats). An average bat colony can **consume more than one million insects per year**.[13]

Threats to Bats

Sources of concern

Wind turbines kill many bats annually

Threats to bats today include:

- **Climate change**

Climate change has affected everything from hibernation periods to the abundance of prey for bats. Many bats have also **not adapted to handle the rising worldwide temperatures**, which can be deadly in the heat of summer.[14]

- **Wind turbines**

Wind turbines can have devastating effects on bats, to the extent that **between 600,000 and 900,000 bats are killed each year** from either crashing into the turbines, or even flying too close (the sudden change in air pressure can cause fatal lung injuries).[15]

- **Habitat destruction**

The **clearing of natural habitats has caused a decline in bat populations** worldwide. Certain caves have also had fires set in them, killing thousands of roosting bats.[16]

- **White Nose Syndrome**

However, one of the most deadly threats to bats today is a fungal disease known as White Nose Syndrome (WNS). It is believed to have been **inadvertently introduced to North America from Europe**, where the native bats are immune.[17]

Many species have been severely affected by the disease since its introduction in **early 2006**. It is **most common in eastern states**, but cases have been reported in the Midwest and West, as well as several Canadian provinces.[17]

WNS gets its name from the **white fungus that grows on the muzzles and wings** of infected bats. The disease causes bats to awaken and leave their hibernation sites early, which **causes a loss of vital fat reserves**, leading them to **starve or freeze to death**.[17]

To learn more about WNS, visit:

www.whitenosesyndrome.org/faqs

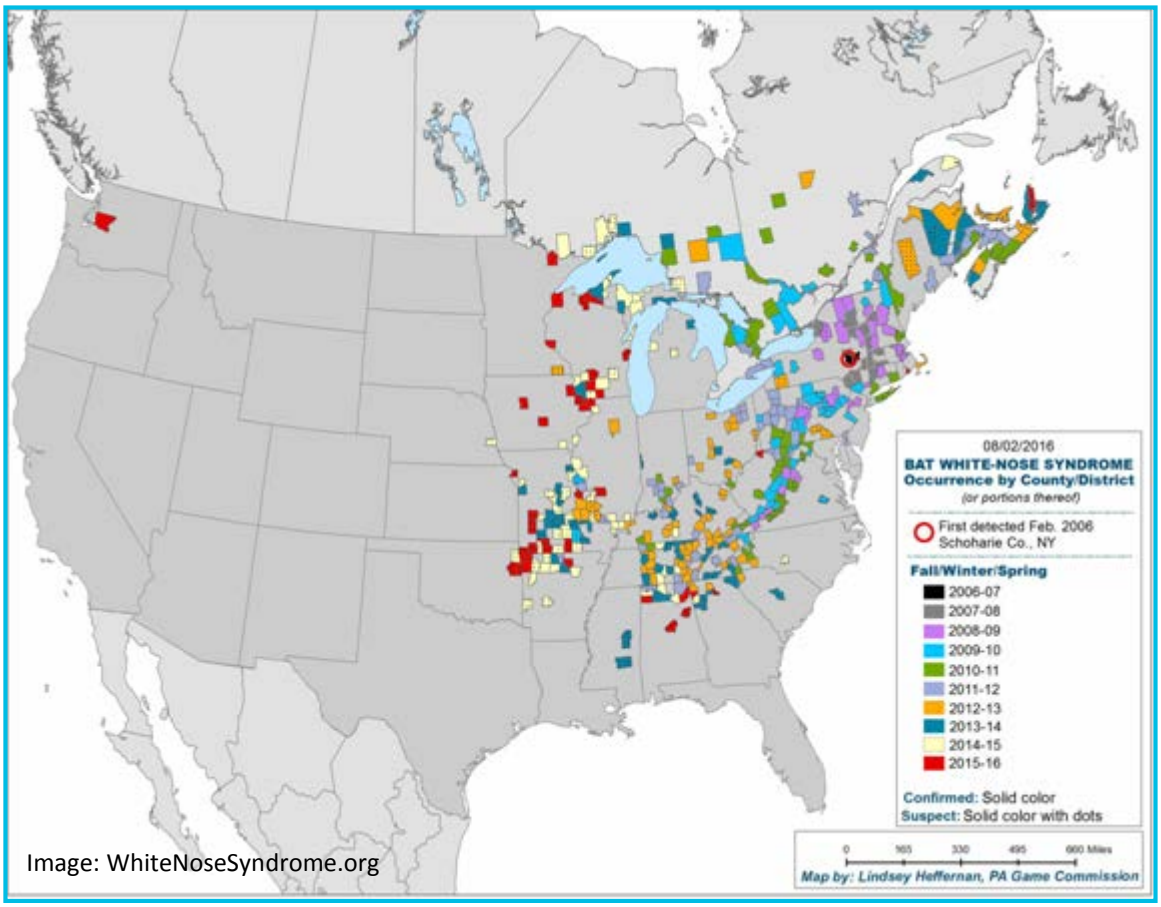
More on WNS

White Nose Syndrome

Little Brown Bat with WNS

WNS primarily **affects hibernating bat species**, which includes **five out of the eight CT species** – the big brown bat, little brown bat, long-eared bat, Indiana bat, and tri-colored bat.[13]

Many species have seen **between 90 and 100 percent mortality** rates in certain areas, with some being reduced to **less than 1 percent of their pre-WNS population** sizes.[17]



Map of WNS distribution in the U.S., as of August 2, 2016

While WNS has had **no recorded effects on humans**, people are advised to **stay away from caves closed for WNS** to prevent the fungus from getting on clothes or caving gear, which could spread the disease to a healthy population of bats. The public should **avoid caves with non-infected hibernating bats** as well, in order to avoid disturbing them.[17]

Why Bat Houses?

Their importance to bats

Photo: Jamie Masthay

Bat houses provide **homes for bats during the spring and summer**. During the fall, bats begin to leave the houses and, depending on the species, either migrate to a warmer climate or find a larger hibernation site for the winter, returning to the bat houses in the next spring.

Bat houses can **vary greatly in size**, from less than a foot tall to several feet. The number of 'rooms,' or chambers, varies as well, with several usually being preferable over one.

Houses with **multiple chambers are better suited to maternity colonies** (mothers with their young), while single-chamber houses are more like 'bachelor pads' for bats.

Note that bat houses in Connecticut should always be **painted black to soak up more sunlight** and hold a higher temperature for their occupants (bats need heat to survive).

Bat Houses Will:

- Provide safe locations for bats to live and raise young, increasing the chances of **vital population growth after WNS**.[18]
- Provide **an alternative to human houses**, decreasing the likelihood of bat/human interactions.[18]
- Attract more bats to your yard, greatly **reducing the number of pest insects** around your home.[18]

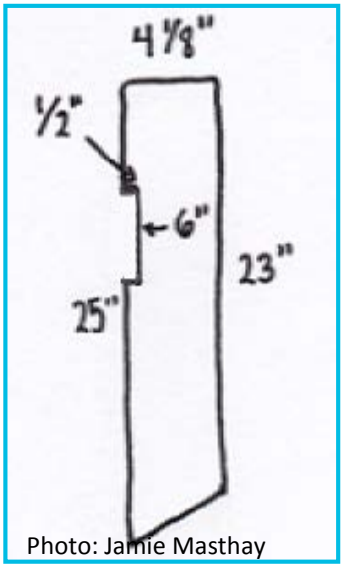
Photo: Jamie Masthay

Building Guide

Materials

All wood pieces used for the house, with black paint added (see step 2)

- **Wood**, cut into various shapes and sizes
  - Cut from **½" outdoor grade plywood**:
    - (1) 17" by 17½" piece (upper front)
    - (1) 5½" by 17½" piece (lower front)
    - (1) 17½" by 31" piece (back)
    - (3) 15 7/8" by 22" pieces (partitions)
    - (1) 6½" by 20" piece (roof)
  - Cut from **¾" pine or cedar**:
    - (2) 4 1/8" by 25" by 23" pieces (second short end will be slanted). 5" from the straight short end, cut away a ½" wide by 6" long section for an air vent (sides)*
    - (2) 1 5/8" by 15 7/8" pieces (roof supports)
    - (2) 5" by 1¼" pieces (5" spacers)
    - (2) 10" by 1¼" pieces (10" spacers)
    - (6) 20" by 1¼" pieces (20" spacers)
- 12 to 20 **roofing nails**, 7/8"
- 20 to 25 **exterior-grade screws**, 1"
- 2 quarts flat water-based **paint or stain**, black, exterior grade
- Narrow mesh **netting**
- Black asphalt **roofing shingles** or galvanized metal shingles



**Side piece example*

Building Guide

Tools

Tools used to build the bat house

Required:

- Hammer
- Table saw or circular saw
- Variable-speed reversing drill
- Screwdriver bit for drill
- Paintbrushes
- Pencils
- Tape measure or yardstick
- X-ACTO knife or other razor blade
- Scissors
- Staple gun with staples

Optional:

- Tin snips
- Sander

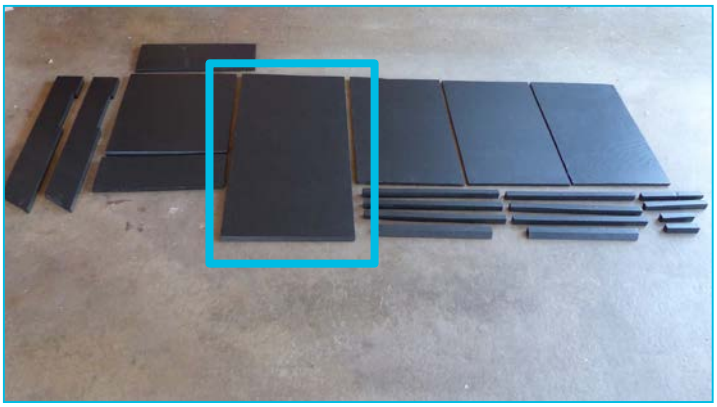
To learn more, visit:
www.batcon.org/resources/getting-involved/bat-houses

Finished bat house, front view

Procedure

Step 1

Eastern Red Bat



Cut **horizontal grooves** into the interior side of the **back piece** (17½" by 31") with a saw. The grooves should be **1/16" deep**, and spaced about **½" apart**.

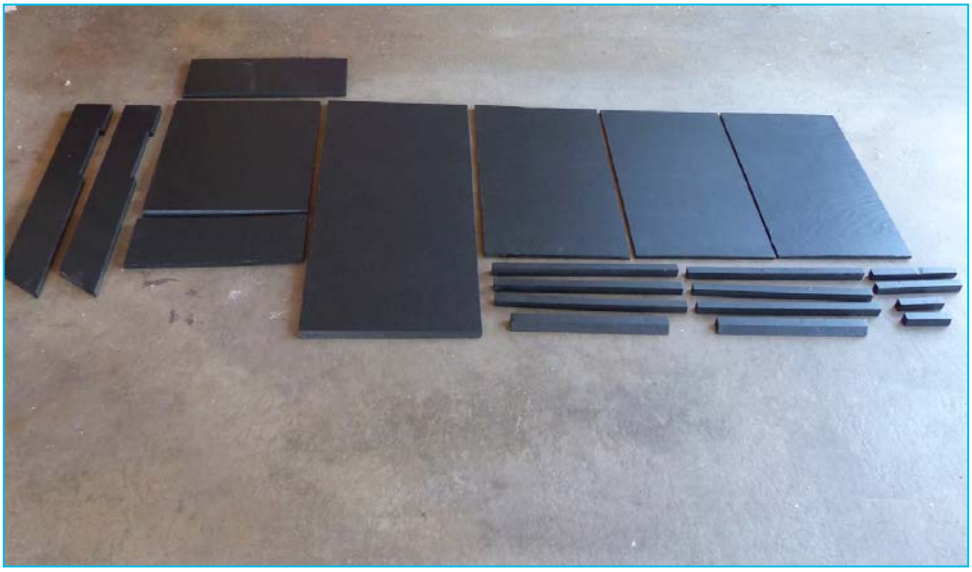
Grooves do not need to be particularly neat; as long as they are the correct depth they will be fine.

Procedure

Step 2

Tri-Colored Bat

Apply **two coats** of black **paint or stain** to all surfaces of wood, **except the grooved side** of the back piece, which **should only have one coat** to stop grooves from being filled with paint.

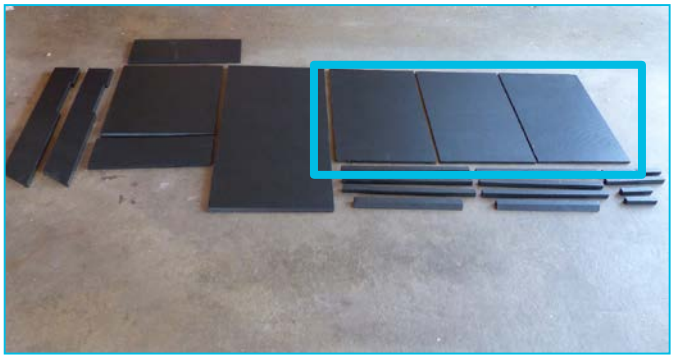


Procedure

Step 3

Photo: USDA Forest Service

Little Brown Bat



Attach **netting** to **one side** of each of the three **partition pieces** ($15^{7}/_{8}$" by 22") using the staple gun. If **staples** are crooked or sticking out, tap them down with the hammer.

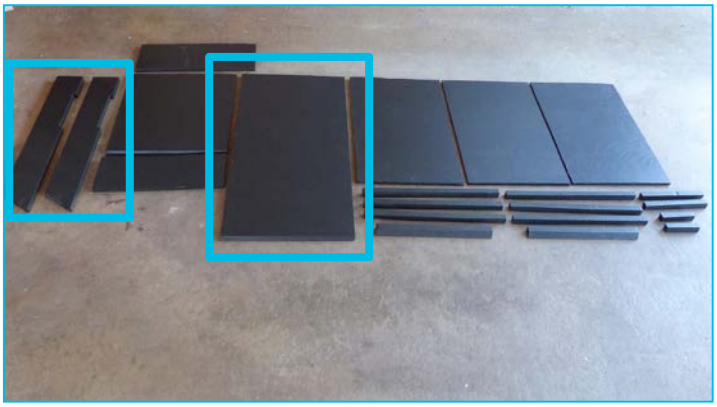
Photo: Jamie Masthay

Cut pieces of netting slightly larger than each partition piece, and fold the edges over the back. Netting should be attached to the back side of the partition, as shown, so that no staples are present on the front.

Procedure

Step 4

Northern Long-Eared Bat



Attach **side pieces** ($4^{1}/_{8}$” by 25” by 23”) **to back** with **screws**, as shown in picture. Make sure **top angles match**.

Procedure

Step 5

Silver-Haired Bat

Attach **5” and 10” spacers** to **inside corners** with screws, as shown in picture. **Do not block side vents**, as they are crucial for air flow.

5” spacers should go below the air vent, as shown, while 10” spacers should go above it.

Procedure

Step 6

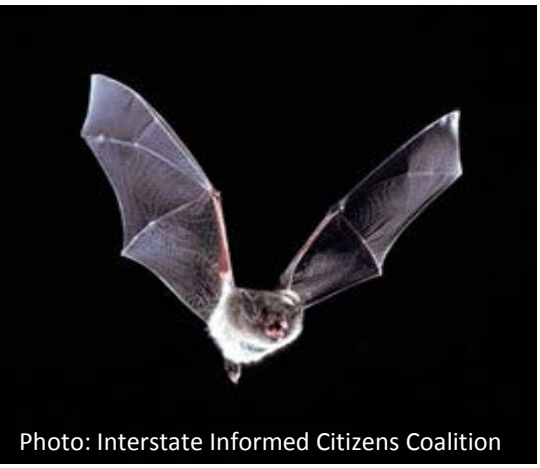
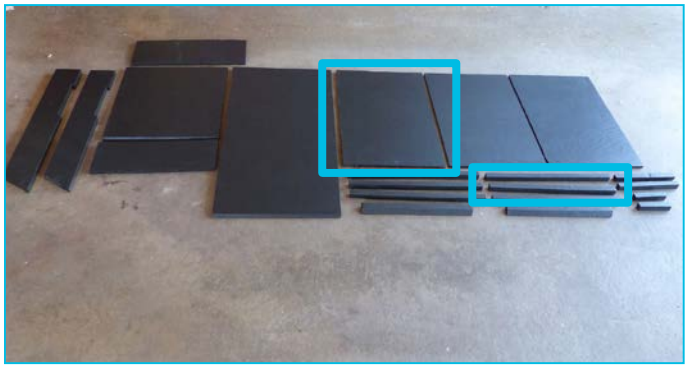


Photo: Interstate Informed Citizens Coalition

Indiana Bat in flight



Place **first partition on spacers**, even with bottom edge of roof. Place **20” spacers on partition** and screw to first spacers. **Do not let screws protrude into side vents**.

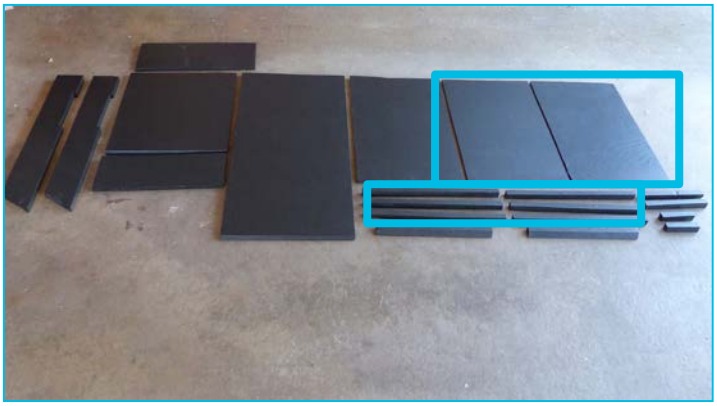
Photo: Jamie Masthay

Wood may crack some when screwing in; to reduce this, drill small holes before using screws, and press any cracked pieces down as much as possible.

Procedure

Step 7

Hoary Bat



Repeat step 6 for remaining **spacers and partitions**. See pictures for clarification.

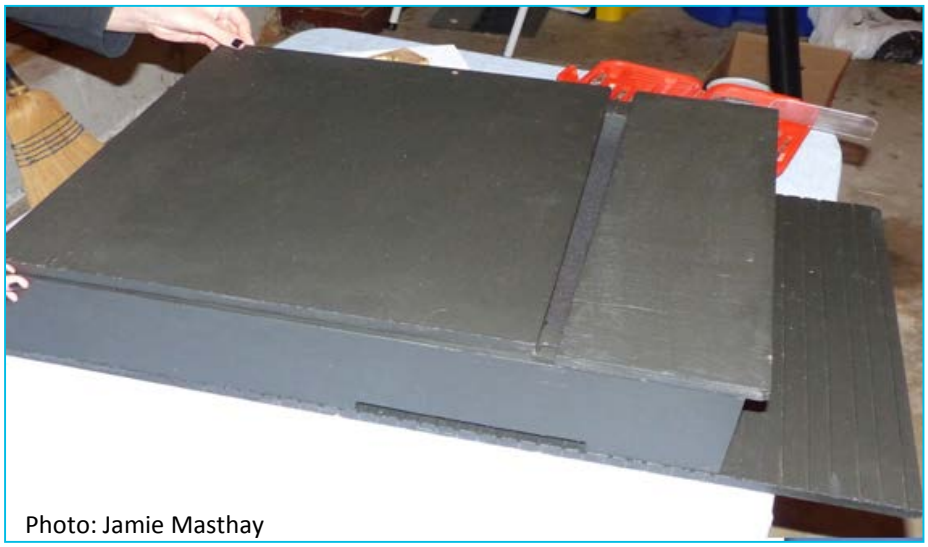
This creates the 3 separate chambers (rooms) of the bat house

Procedure

Step 8

Big Brown Bat

Attach **front** (17” by 17½” and 5½” by 17½”) **to sides** with screws, top piece first. Be sure **top angles match**. Leave **½” vent space** between top and bottom front pieces.



Procedure

Step 9

Eastern Red Bat

Attach **roof supports** ($1^5/_8$" by $15^7/_8$") **to the top inside** of front and back pieces with screws. See pictures for clarification.

Procedure

Step 10

Silver-Haired Bat

Attach **roof** (6½” by 20”) **to sides** and roof **supports** with screws.

Be especially careful to only screw into sides and roof supports; do not let any screws protrude into roosting chambers.

Procedure

Step 11

Indiana Bat

Cover **roof with shingles**, using nails to attach them in place (**nails work better than screws** here).

Finished bat house, front view

Or, **if you would prefer to buy** a bat house, please visit:

http://www.batcon.org/resources/getting-involved/bat-houses/bat-house-buy

Installing a Bat House

Things to keep in mind

Photo: BatWorlds

Little Brown Bat

- Bat houses should be placed **at least 10 feet off the ground**, preferably more, to prevent predators from entering the house.[19]
- Bat houses should **never be hung on trees**, as the ridges in the bark make it **easy for predators to climb into the house** and attack the bats within. The houses should be installed **at least 20 feet away from trees**, preferably more, to avoid predators.[19]
- The **side of a building (a house or barn), or a smooth pole are better locations than a tree**. Keep in mind that if you do use a pole, it should be smooth – **do not use as a wooden pole with bark attached**, as it will act in the same way a tree would.[19]
- **Single-chamber houses should be mounted on buildings** to preserve heat, while multiple-chamber houses can be mounted on buildings or poles.[19]
- Bat houses should be placed as **close to a source of standing water** (such as a pond) as possible, though anywhere between 20 feet and ¼ of a mile will do. If still water is not available, **running water will suffice**.[19]
- **Sunlight is a very important factor**, as it is what keeps the house warm enough for bats to inhabit it. The house should get **at least 6 hours of full sun a day if possible**, with morning sun being preferable over afternoon sun.[19]

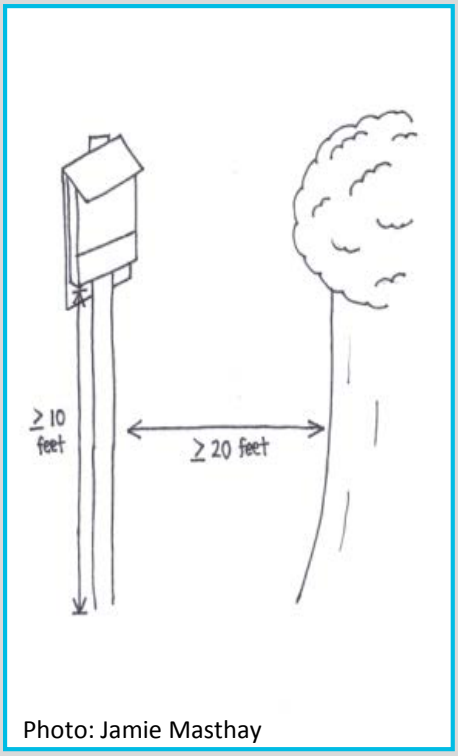


Photo: Jamie Masthay

To learn more, visit:
www.batcon.org/resources/getting-involved/bat-houses/install

Checking for bats

The most effective ways

Tri-Colored Bat

- The easiest way to know if there are bats using the house is to **check for bat droppings** (also known as guano) **on the ground outside of the house**. An example of bat guano can be seen below.

- Other methods can include **shining a flashlight up into the house** (do not do this for too long or too often, as this can disturb potential bat inhabitants), or **waiting at night to see if you can observe any bats leaving** the house; bats typically start exiting the house about 30 minutes after sunset, but can leave earlier or later.

- Bats will usually **inhabit the houses between April and September**, as this is when they are not hibernating.[4]

- If you do not see any bats, do not despair. As bat populations have been so low lately, **there are going to be some uninhabited houses throughout the state**. In addition, bats often do not inhabit a house for a year or so, simply because they do not find it or trust it as a safe space.

The photo to the left shows a typical example of bat guano, with a penny placed nearby for a size reference.

Caution:

Please be careful around bat guano; **do not breathe the air directly around it, or touch it with bare skin**, as it has been **linked to a lung disease** known as histoplasmosis. **Take precautions when dealing with bat guano:** wear gloves and a face mask when removing it, if necessary.[20]

Final thoughts

Bats in flight

Questions can be directed to the following:

- Dr. Cisneros: laura.cisneros@uconn.edu
- Jamie Masthay: jcmasthay@gmail.com
- CT DEEP (Department of Energy and Environmental Protection):
  - deep.webmaster@ct.gov
  - (860)-424-3000
  - Connecticut Department of Energy and Environmental Protection, 79 Elm Street, Hartford, CT 06106-5127 (mailing address)

Thank you for helping make a difference.

Coming Soon…

A **citizen science bat house monitoring app** is in the process of being created. **Contact Dr. Cisneros for more info** on how to help us monitor the use of bat houses statewide.

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