

**BATS YOUR ORGANIC CHOICE FOR INSECT CONTROL**

**By**

**Joseph Parish**

*Bats are not just some cute Halloween creatures but can aid your garden greatly. Why not invite them in?*

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## SECTION I

### INTRODUCTION

As you see before you stands a vampire and a bat. We know the vampire is not real however bats are and in the past they have received a considerable amount of bad PR. My name is Joe Parish and I am one of Sussex County Master Gardeners. For the last three years I have volunteered with the Delaware Bat Spotter Program.

As a child a favorite pastime of mine during the warm summer evenings was to watch the bats fly over an open yard. I would obtain a nice comfortable spot in the grass and watch them hunt for their night time meal while admiring their acrobatics. If I listened carefully and the night was quiet and still, I could hear a few fluttering flaps from their wings and perhaps a squeak here and there. Now, as an adult I still watch for bats during the summer months. When I see one of these furry little creatures, I feel that same sense of wonder that I experienced as a young child. You too can catch that feeling by visiting Trap Pond State Park. One of the areas which I monitor in the summer is the pavilion near the boat rental. Inside the enclosure are about three dozen bats and you can see them nesting during the day. Upon the approach of dusk they will take off and do the job nature designed them to do.

Bats have always been a welcome part of my life and I encourage their residence in my garden. Unfortunately, bats represent one of the least understood of nature's creatures. A bat is one of the only mammals capable of flying and they make up almost one fourth of the entire mammal population.

The mere mention of the word bat frequently conjures up visions of some sort of blood-sucking, rabies-infested creatures from the late night horror movies. In general, the vampire films with Count Dracula, spooky bat decorations like you see during Halloween and blood sucking, ghostly tales have given bats an unfair, bad reputation. Such propaganda couldn't be further from the truth. Bats are relatively harmless and rarely bite humans unless provoked. They are not some demonic, blood-sucking, disease-ridden parasites stalking their prey late into the dark night. These nocturnal flying furry creatures are actually timid, gentle animals that usually do their best to avoid human contact.

Its time to forget the anti-bat campaigns concerning how fearsome and dangerous they are and view these small creatures as a useful addition to your garden

Most people are afraid of bats but this is actually an unnecessary fear. With many people just the thought of these creatures swooping near them at dusk runs shivers down their spine. Many have unfounded fears of the bats turning into vampires on those dark and stormy nights. However, I am not here to create a scary atmosphere at Carvel this day before Halloween but rather to introduce you to a valuable garden assistant. As a gardener you may start to think differently about bats. Yes, they may be frightening at first but you will quickly discover some amazing benefits of having bats in your garden.

Bats represent a smart organic insect control method for beetles, crop pests, mosquitoes and moths. It is not unreal for a bat to consume one forth to one half of its body weight in insects each night while a nursing mama bat is likely to eat more than her body weight in insects. At the same time don't forget the minuscule weight of a mosquito so it takes a lot of eating for the figures to match up. The average bat has a lifespan of from 5 to 20 years while raising only one pup per summer. Once you encourage these little creatures to accept your garden as home they will return to the same roost each year. The most common bat found in Delaware is the Big Brown Bat. The name for these bats is misleading as they usually seem very small to me.

If you are like me, I hate to put all the work into a garden only to find it is the main course for the insect world. Here is an interesting note that should cause a smile to cross your face. Seventy percent of the more than 1,000 bat species feed exclusively on insects catching upward of 1000 mosquitoes per hour.

### **Types of bats**

There are 44 species living in North America some of which are endangered and others that are listed as species of concern. Within the state of Delaware we have a small host of different species of bats. We generally divide them into two distinct groupings based upon their lifestyle.

Delaware's cave bats spend their winters hibernating in caves and often form colonies to roost and raise their young in the summer. Colonies can be found in hollow trees, or buildings and other man made structures.

Tree bats are generally more solitary in nature, roost under pieces of bark alone or in small groups and spend their time foraging in the upper canopy levels of the forest. All these things make tree bats difficult to study. They have been known to migrate long distances during the spring and fall.

### **Delaware's Cave Bats**

#### **Little Brown Bats (*Myotis lucifugus*)**



The little brown bat historically has been the most common species people encounter. This species often forms nursery colonies containing hundreds, sometimes thousands of individuals in buildings, attics, and other man-made structures.

A little brown bat's diet consists of aquatic insects mainly midges, mosquitoes, mayflies, caddisflies, moths, beetles, and crane flies. Individuals have been reported to catch

hundreds of insects in an hour during peak feeding activity. Little brown bats appear to be the hardest hit by White-nose Syndrome, and in some areas are expected to be extirpated (regionally extinct) within twenty years.

### **Big Brown Bat (*Eptesicus fuscus*)**

The big brown bat is found in virtually every American habitat. Traditionally, these bats formed maternity colonies beneath loose bark and in small tree cavities. Common maternity roosts today can be found in buildings, barns, bridges, and bat houses. Small beetles are their most frequent prey. Numerous feeding studies of big brown bats



indicate that they feed on crop and forest pests like ground beetles, scarab beetles, cucumber beetles, snout beetles and stink bugs, many different moth species, and leafhoppers. Like many bat species, reproductive females often can consume their body weight in insects each night. Big brown bats rank highly among America's most beneficial animals to humans. As habitats change and forests are replaced by development, these adaptable bats will move into buildings and other man-made structures. Armed with good information, humans and bats can coexist peacefully. Putting up bat boxes is a beneficial option to keep bats out of our homes, yet near enough to enjoy the benefits of their insect-eating capabilities.

### **Tri-colored Bats (*Perimyotis subflavus*)**



The tri-colored bat (formerly Eastern pipistrelle) is one of the most common species of bats found throughout the eastern forests of America, but surprisingly little is known about where it roosts in the summer and raises its young. These bats are among the first bats to emerge at dusk. Tri-colored bats have been found

to feed on large hatches of grain moths emerging from corn cribs where this insect is a pest. This species is among the first bats to enter hibernation each fall and among the last to emerge in spring. Hibernation sites are found deep within caves or mines. These bats have strong loyalty to their winter hibernation sites and may choose the exact same spot in a cave or mine from year to year.

### **Northern Long-eared Bat (*Myotis septentrionalis*) – cave bat**

Northern long-eared bats are known to live in dense forests and often use peeling bark and tree cavities for maternity roosts. They rely on caves and underground mines for

hibernation sites, where they typically use cooler areas in the cave than eastern tri-colored and little brown bats. This species is generally solitary and is most often found alone or in very small groups. During the summer, the Northern long-eared bat appears to rely upon forested habitats. Little is known about its food preferences, although they have been observed hunting along forest edges, over forest clearings, at tree-top level, and occasionally over ponds.



### Delaware's Tree Bats

#### Eastern Red Bat (*Lasiurus borealis*)



Eastern red bats are North America's most abundant "tree bat." They will roost on low tree branches, looking perfectly camouflaged like a leaf as they hang partially wrapped in their furry tail. Red bats are mostly solitary, coming together only to mate and to migrate. Unlike most bats, Eastern red bats often give birth to twins and can have litters of up to five young, though three young is average. In the summertime red bats are among the earliest evening fliers, typically feeding

around forest edges, in clearings, or around street-lights where they consume mostly moths. In the fall they migrate long distances using the same migratory routes along the Atlantic seaboard as many birds. Very little is known about their winter habitat or behavior, but they have been found hibernating in leaf litter on the ground.

#### Hoary Bat (*Lasiurus cinereus*)

Hoary bats are one of America's largest and most handsome bats. With their long, dense, white-tipped fur, they have a frosted, or hoary, appearance. Humans rarely see these magnificent bats; they are not attracted to houses or other human structures, and they stay well-hidden in foliage throughout the day. In the summer, hoary bats don't emerge to feed until after dark. In one night,



Hoary bats can make round trips of up to 24 miles as they hunt for food. In late summer

and early fall they migrate south in the company of flocks of birds. Hoary bats are widespread throughout most of Canada, United States and into Central and South America. Hoary bats are Hawaii's only native mammal.

### **Silver-haired Bat (*Lasionycteris noctivagans*)**

Silver-haired bats are very elusive, and have silver-tipped hairs running down their back. They are among the more common bats in forested areas of America, especially old growth forests. They form maternity colonies in tree cavities or small hollows. Typical hibernation roosts for this species include small tree hollows, beneath peeling bark, in wood piles, and in cliff faces. Occasionally silver-haired bats will hibernate in cave entrances. Like big brown bats, the silver-haired bats have been documented to feed on many agricultural and human pest insects. Silver-haired bats have been known to take flies, midges, leafhoppers, moths, mosquitoes, beetles, crane flies, lacewings, caddisflies, ants, crickets, and occasional spiders.\



### **Evening Bat (*Nycticeius humeralis*)**



The evening bat is a true forest bat and is almost never encountered in caves. They form nursery colonies in hollow trees, behind loose bark, and sometimes in buildings and attics. Evening bats emerge soon after dusk and forage on a large array of small nocturnal insects including flying ants, spittle bugs, June beetles, Japanese beetles and moths.

In the fall, evening bats store large amounts of fat that they need for their lengthy migration to southern parts of their range. In a banded bat recovery study, bats were found approximately 340 miles south of their banding sites. Yet, little research has been done to learn exact migration movements of this species. They have never been found hibernating in local caves and appear to simply disappear from their summer habitat. Once these bats have arrived at their over-wintering sites, they are thought to remain active throughout the winter.

## **SECTION II**

### **MYTHS**

#### **Bats are Disease Carrying Rodents**

Myths abound concerning these little harmless creatures. One myth is that bats are disease-carrying, dirty little rodents. Actually despite the common comparison bats are not related to rodents at all. Mice, rats, and other rodents tend to have short lives and breed in massive quantities, whereas each offspring produced by a bat is a major investment. They are in a class of animals called Chiropteran, which means 'hand wing.' That's because the parts on the wing that look like sticks of a kite are actually fingers.

### Bats are Blind



Another myth is that bats are blind. Remember the saying, "Blind as a bat." First of all, bats are certainly not blind. They have eyes just as we do. Many of the larger bats see three times better than most of us. Their ears are essentially a second pair of eyes, as they use biosonar or echolocation to navigate the night skies in search of food, when other mammalian competitors are fast asleep. Thus they use their sight as well as the chirping sound and other inaudible sonic sounds known as echo location to find insects so they are

not blind as the myth would have us believe.

### Bats Spread Rabies



Many people are concerned that bats spread rabies. This is simply not true. A bat will not get rabies any more than other mammals. Less than one percent of bats carry rabies. You cannot get rabies from being in the same room as a bat. If you are bitten by a rabid bat or other animal (raccoons are the most common rabies vector in DE), you can be easily treated if medicine is administered soon after exposure.

### **Bat droppings are poisonous**

Bat droppings (guano) are poisonous to me or my children. Bat guano is a valued fertilizer. A specific fungus can grow on bat guano, which if disturbed and inhaled can cause “histoplasmosis.” Histoplasmosis exposure is preventable, use a face respirator in areas with large amounts of guano. Histoplasmosis occurs naturally in the environment, bat droppings are one of many ways to be exposed to the spores.

### **Bats Tangle in your Hair**



There are active myths that they tangle in your hair, or that they will swoop down and attack you as they suck the blood from their victims. They have been accused of being aggressive and trying to bite people and that they are dirty and covered with lice. This common myth that the bats are rabies-infested devils always seeking a nice head of hair to get tangled in is nothing more than a result of the 1980s stereotype movies. First off bats have a sophisticated echolocation system they use to hunt tiny insects and avoid collision. Bats can see you, they have good vision. Using echolocation, bats can avoid a strand of fishing line with no trouble. Bats eat insects like mosquitoes. Mosquitoes are attracted to people, so occasionally bats hunt around people. Bats do not attack, but will use their teeth to defend themselves if cornered or grounded. Secondly, bats groom themselves frequently and keep

their fur very clean. However, there are a few specially adapted parasites sometimes found on bats. Bat bugs are a cousin of bed bugs and are occasionally found on bats.

### **Killing Bats with Tennis Rackets**

Someone told me to kill a bat with a tennis racket because they can't see it coming. NO! There is no need to kill bats that accidentally get into buildings. Never

strike, spray or whack a bat. Bats to be submitted for rabies testing should not be released. Bats in buildings should be isolated to one room, windows or doors to the outside opened, and lights turned on until the bat finds its way back outside.

### **SECTION III**

#### **WHITE NOSE SYNDROME IN DELAWARE**



Like many popular species the bat's population is rapidly declining due to not only pesticide use and habitat loss but White Nose Syndrome as well. It is not unusual for the tree bats here in Delaware to migrate great distances from their familiar summer roosts in our area to a more pleasing wintering ground elsewhere. Our local cave bats will enter caves in local states in order to hibernate over the winter. In the spring our bats usually return to feast out on the Delaware insects.

The most deadly illness a bat can contract is known as the White Nose Syndrome. Have no fear as humans cannot catch this illness. We are fortunate here in Delaware that only the bats located at Fort Delaware and Fort DuPont State Parks have this fungus disease. As a bat spotter I am assigned to a colony and several times per year I sit at the location in the evening and take a count of the bats leaving the nest. This is done before they have babies and again when the babies are ready to leave the nest. Once or twice per season we will capture and check the health of certain colonies of bats. To me this is one of the most enjoyable events associated with the program.

### **SECTION IV**

## **BENEFITS OF BATS IN YOUR GARDEN**

Some people think bats look scary but they help the gardener in many ways. If you spend a lot of time in your garden or outside, having bats around can be quite beneficial. As we previously mentioned, most North American bats eat insects and will gobble them up at a rate of over 1,000 mosquitoes per hour. That means a colony of 75 bats can eat 75,000 insects in a single sixty minute period or perhaps more than 100 tons of insects in a single season. This makes them better than birds and bug zappers in devouring insects. What better pest control can you find?

### **Bats for Fertilizer**

Bats do much more than just keep insects at bay. Another advantage to encouraging bats to stay around your property is that their excrement (called guano) is also an excellent nutrient rich organic fertilizer which will enable your garden to thrive as it never did before. Bat guano for use as fertilizer has been in practice for many years and has been recommended by many top gardening sources. It provides an abundance of phosphorus and nitrogen which are two of the plant's favorite nutrients. The guano is low in odor and works to make plants and lawns green and healthy. It can be used to enrich soil when used as a top dressing, or by making a "tea" and using it with regular watering practices for deep root feeding.

To make bat guano tea for your garden, simply let it sit in water overnight (generally 1 cup of guano per gallon of water), then water your plants with the mixture. This natural and safe plant enhancer can be used on flowers, ornamentals, vegetables and herbs. Should you want to make a fertilizer, and are concerned with histoplasmosis you could wear a mask when gathering the guano.

### **Insect irradiators**

We have mentioned that there are several benefits to getting bats to reside on your property. By getting the bats to do your insect elimination you avoid the use of toxic chemicals and insecticides in your garden.

Bats eat a lot of mosquitoes but they also devour midges, caterpillars, moths, gnats, and large flying beetles. Granted some birds will eat these insects however birds only work the day shift while the bats are content on the graveyard shifts.

In the state of Kansas, bat populations have effectively eradicated corn rootworm moths reducing the need for insecticides. What goes in must come out therefore after eating all those insects the digest and excretes droppings which act as a valuable garden fertilizer rich in phosphorous and nitrogen.

### **Plant Pollinators and Seed Distributors**

Bats are very important to many species of plants around the world. In the tropics, fruit and nectar feeding bats are very important to the survival and re-growth of the rainforest. Fruit eating bats disperse rainforest seeds as they fly, many miles each night. Nectar feeding bats pollinate the flowers of many valuable plants, including bananas, mangoes, dates and figs. In desert areas, bats are important pollinators. Many cacti species depend on bats for pollination and only open their flowers at night. Bats are the primary pollinators of the pipe organ cactus and the agave from which we produce tequila relies solely upon bats to pollinate its flowers and reproduce. And of course the many insect eating bats found around the world are important in protecting plants by controlling the insect pest population.

Although bees are considered the primary pollinator of our gardens we can no longer rely upon our popular honeybee population for pollination issues. That is where bats come in.

Bats also distribute seeds. They ingest the fruits, digest the pulp surrounding the seeds, and then defecate the seeds. Seed retention time within bats is often less than 20 minutes and the bats often defecate the seeds while in flight.

## **SECTION V**

### **HOW SAFE ARE BATS**

Bats are perfectly safe to have around. Unlike me you will probably never handle a live bat. Bats like any other mammal can catch rabies however there are only three species of bats which spread rabies and they live in Central and South America. It is an unlikely event that a bat will catch the disease but if they do you are less likely to come into contact with them. Our Big Brown Bats found locally are totally rabies free.

## **SECTION VI**

### **ATTRACTING BATS TO YOUR GARDEN**

So the question remains how to you attract these useful creatures to your backyard. It is illegal to buy or sell bats and even if it wasn't, catching and releasing them into a new area is unlikely to work, thanks to their strong homing instincts. However, like all other creatures, bats seek out locations beneficial for food, water, and shelter. Unfortunately, bats do not seek apartments and housing with a handy internet search so in all honesty there is no telling if they will take up residence in the house you create. Depending upon who you may ask, the wooden structure may remain untouched for any number of reasons: the structure isn't large enough or the location isn't perfect or the local wildlife has already taken up roost in different dwellings. It is even a possibility that the structure may never be inhabited but just like the lottery, you can't win if you don't play.

### **Are bats in my location**

First you must determine what bat live near you. In most cases in our area it will be the large brown bats. If in doubt check with the Delaware Division of fish and wildlife or visit the Delaware Bat Program homepage.

*<http://www.dnrec.delaware.gov/fw/bats/Pages/Default.aspx>*

Or perhaps pay a visit to the Bat Conservation International website. They are loaded with valuable information about bats.

*<http://www.batcon.org/>*

Remember a little information can go a long way. If your goal is in fact to attract bats to your yard, you should consider how the needs of the animals fit with the environment you have created. Ask yourself these questions:

Are there places for the bats to stay or rest? If not, you will not have bats that live on your property.

Are there potential food sources? The most common bats to visit backyards are usually insect eaters. If there are no insects due to the use of pesticides, you will not likely have bats.

Are there their irritants that may discourage bats from coming to your yard? For example, many of the insect-eating bats use a combination of echolocation and passive listening to determine the location of the insects they prey upon.

### **Water source**



Next you will need to offer the bats a clean accessible source of water. Bats are hard workers and they often lose 50% of body weight in water in only a single day. Having a lakes, ponds or stream within a quarter of a mile on your property insures the bats can swoop down over the surface of the water and take a badly needed drink. Such natural water supplies would certainly entice the bats however a garden pond with short plants is an excellent water source. If you don't have a natural water source or pond you could install a bird bath. Be sure to protect the bats from any predators including pet cats.

### **Flowers**

Third, you must let your garden act as a magnet for the bats. Bats come out at night so they work for you as you sleep. These ravenous little pest controllers love nothing more than munching mosquitoes, but they also devour leafhoppers, cucumber

beetles, flies and moths. Aromatic flowers, herbs, and night-blooming plants frequently will attract night time insects which naturally will lure the bats to your garden.

### **Food**

Food needs depends upon the species of bat in your area. The Pacific Pallet bat, for instance, found along the coast in northern California, delights in centipedes and scorpions, but it also relishes meal worms. Mexican free tail bats are specially equipped with long, slender wings for feeding at high altitudes in warmer parts of the U.S.

Bats will feast out on such insect delicacies as:

- \* Cutworm moths
- \* Chafer beetles
- \* Potato beetles
- \* Spotted cucumber beetles.

An interesting note is that some species of moths can actually detect a bats echolocation and will avoid the area where bats are present.

Lights act as bug magnets and are an easy way to invite bats to your property. This is not a necessary step but it certainly helps to attract the insects at night. Something as little as a simple lamp kept on outside of your garage could be all that is needed.

### **Plant a Bat Garden**



Since bats here in Delaware are insectivores and feed only at night attracting insects which are active at night is a critical point if you wish to attract bats to your garden. Since they do feed at night you will want to plant typical late day blooming and night scented plants which attract the bugs and insects which are active at night. These night bloomers

are generally pollinated by night time insects such as moths. The moth is one of the bats favorite meals. Those plants which attract night time insects are:

- \* French marigold
- \* Moonflowers
- \* Thyme
- \* Raspberry
- \* Honeysuckle
- \* Evening Primrose
- \* Datura – Many gardeners report witnessing an abundance of moth activity among their annual devil’s trumpets (datura), as well as brugmansia. Here in Delaware you can grow these as a tropical potted plant.
- \* Four-O-Clock Primrose
- \* Night-Blooming Water Lily
- \* Night-Blooming Jessamine
- \* Cleome
- \* Phlox
- \* Night Flowering/Silene Catchfly
- \* Fleabane
- \* Goldenrod
- \* Salvia Nicotiana

Have plant with a pronounced nighttime fragrance in your garden. Pale-colored blooms also have a good chance of bringing in bugs.

These ravenous little pest controllers love nothing more than munching mosquitoes, but they also devour leafhoppers, cucumber beetles, flies and moths.

## **SECTION VII**

### **BAT HOUSES**

Bats usually nest in abandoned buildings, hollow trees, under a building's eaves, in loose tree bark or in many cases in bat houses. To attract the bats to roost in your yard you will need a place for them to call home — a bat house! Timing is important for setting up your bat house and since this is October you have until spring and early summer to get accommodations accomplished for your prospective residents. It is important to choose the right location for your bat house. Bats usually reside in dark, protected locations such as the hollow trees, under loose tree bark, or in caves as mentioned above. In urbanized areas, they may frequent attics, the back side of house shutters, downspouts, and even storm sewers.



Another method of attracting bats is to provide them with a wooden bat house. This is a great addition to your garden decor. You can purchase them ready made on line or you can easily build one yourself. Enclosed in the handout is a simple bat house plan from the Bat Conservation International. Fasten the bat house securely to the south side of a pole or building to absorb the warmth of the sun. Do not mount them on the side of a tree as this would provide easy access to predators and provides too much shade for the bats. Place the house 12 to 18 feet above the ground. When a bat leaves its house it will usually drop down before they catch flight thus the houses need to be installed high enough to provide this “runway” for the animals. If you place a bat house in your yard chances are that it will be occupied within a few hours. However be patient and allow time for bats to discover and examine the house. If it is still unused after a two years period try moving it somewhere else. 90 percent of bat houses which attract bats do so within two years while the other 10 percent take three to five years.

It is not unusual for bats to live in dead trees where there is an abundance of places for insects. If you train your fragrant perennial vines to climb walls or fences you may encounter possible roosting sites. Another approach is to create a sheltered corner by using any combination of walls, fences, or hedges at two angles.

Ponds provide water for insects to reproduce. Un-mown areas provide shelter and food for insect larvae. Garden lights can attract insects and serve as a feeder for the bats.

### **Build Your Own Bat House**

In a single afternoon you can build your own bat house. You can approach the task in one of several ways. First you can purchase kits made from cedar however any type of wood which is not toxic is sufficient for a bat house. Do not use pressure treated wood.

When constructing your own bat house use screening for the bats to land on and travel up inside your bat house. Do not use fish netting as that could snag on the bat’s wings. Be sure to completely drive in any extruding staples or nails that could injure the bats.

After assembling the house and screen, put the sides on and secure it with a few screws. The front portions slide in and you’re ready to go. A bat house should have about 3/4 of an inch of space in the chamber. Bats like it cozy. The color you choose will also affect the warmth or coolness of the structure. Apply three coats of flat, exterior, brown or gray latex paint to your bat house and you’re ready for occupants. A house that gets only a few hours of sun a day should be painted a darker shade while a lighter color should be used on boxes with a long daily sun exposure.

An interesting idea that many bat lovers find success is in double houses either side by side or back to back, one side dark and one side light. This method allows the bats to relocate within the structure according to their needs.

Your bat house should face southeast where it gets the most morning sunlight. Bats like between four and seven hours of direct sunlight per day. You can hang it in an open area on a barn, other outbuilding, or mount it on a pole. See Section X for easy instructions on how to build your own bat house from scratch.

### **Temperatures**

Temperatures are vital for a successful bat colony. Bats prefer warmer climates between 85 and 100° Fahrenheit. Be sure to position the bat home facing a sunny location but not too sunny. East-facing is usually best, where they get morning light but are protected from heavy afternoon sun.

### **House dangers for the Bats**

There's a good chance the bats will return each year, but if you've given them a bat house, some maintenance may be required after they move out for winter. Inspect the house between spring and early fall to ensure that no bees or wasps have taken up residence. Any wasp remains should be cleaned out each winter after the bats and wasps have departed. Do not use any sprays to get rid of the bees or wasps as such chemicals are likely to ham the bats as well. 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 monthly for issues like predators, overheating, and rotted wood or other damage.

### **Protect your home**

Bats are not inclined to chew holes in your home's attic. However, if there are holes, they can gain access. Make sure you are not inviting the bats into your home by ensuring that they cannot find these small holes to get inside. Bats and humans are more compatible when they aren't sharing a house. Keep in mind bats can fit through a hole the size of a quarter so seal up all openings around your home.

### **Free Fertilizer**

Once you have bats in your garden start collecting your free guano fertilizer on plastic sheeting from beneath your bat house. Take one cup of guano and mix it with a gallon of water and let it sit overnight. The next day just give it a shake and voila — free fertilizer.

## **SECTION VIII**

### **CONCLUSION**

In conclusion bats are vicious monsters from your worst nightmares if you are a beetle, a fly, a moth or a mosquito. However for us humans the bats are more of a blessing than a curse. So in ending this workshop remember the more bats swooping around at dusk, there are fewer mosquitoes and flies to spread disease, fewer moths to

swarm streetlights, and fewer beetles and moth larvae to raid your vegetable gardens. The bats value to American agriculture ranges anywhere from \$3.7 billion to \$53 billion per year so isn't it worth keeping these little creatures around?

Due to the increased use of pesticides and habitat loss, bat populations are declining in most areas. By creating a bat-friendly garden and yard, not only will the bat population benefit, but you will also be doing good on a grander scale.

After attending this workshop I hope you realize that attracting bats to your backyard is one of the safest and most efficient methods out there for natural insect control. Remember, the next time you encounter a bat, don't give in to the fear that folklore and myths have instilled in us. Respect bats for their ecological importance, and save those wooden stakes for supporting your garden plants. You won't find any vampire bats in North America.

Again, I repeat it is not a good idea to touch or handle the bats themselves, both for their safety and yours however you could sit back in a lawn chair in the evening and watch them hunt. As you watch them swoop and fly overhead just think of all the bug bites and ruined tomatoes they're helping you avoid. So when you are in Wal-Mart's next season and you are shopping for citronella candles, geraniums, and other mosquito deterrents why not consider giving a few flying friends a home instead.

I would like to thank everyone who has come to the workshop and hope that you leave here with a new insight on bats in general and how they can benefit your home garden.

## SECTION IX

### AN INTERVIEW WITH A BAT BY JOSEPH PARISH

*The following article was written after several people had mentioned to me that they would like to make a pet out of a bat. This is a bad idea all the way around and I hope if you have that thought in mind after reading this brief tale you will forget such intentions. These are sensitive animals.*

JP

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As a pepper and survivalist I have come to appreciate many things in life that most people pass by. A typical example of that are the useful bats. In a SHTF scenario we will not be able to rush to our local grocery store or pharmacy to purchase bug repellent therefore we need to become friends with our local bat population. Bats will be a very important ally during disasters when there is no means at our disposal to control the bug infestation. Therefore, why not let the bats do the work for us.

As everyone knows, I am an active participant in the DNREC, Division of Fish & Wildlife's Delaware Bat Count Spotters. The state of Delaware has been monitoring our local bat population since 2009, in an effort to report upon the devastating fungal disease known as the White Nose Syndrome. We monitor the bat population and on occasions capture and band bats within a specific location. I am one of the people in the program who have received the proper immunization and training to actually handle these nine different adorable bat species. Working with these delightful creatures for the past three years has evoked a feeling in me that I would not mind having one as a pet however after this interview with a bat the thought has been completely dismissed from my mind. For several days now I have been watching dozens of videos on YouTube concerning bats and their captivity. This survival tale is a fictional account of an interview with a captive, female bat held in a cage.

I have no name since we do not normally assign names to our populace. I remember clearly how in July of 2008 I was minding my own business hanging out with my mother when the two of us were captured. After the villains grab us with nets we were initially placed in an exotic pet collection within under sized cages for a miserable 10 long agonizing years until I was finally rescued. Both my mother and I were held captive as pets and unfortunately my mother failed to survive the ordeal. She died several years after we were placed in the cage.

Picture for a moment being taken captive by some unknown creatures and every day I looked at my four walls and ask myself, "Why." Unfortunately, the answer never appeared to me. I failed to understand my capturer's language and any attempts I made towards escaping were fruitless. I felt totally terrified, hanging alone in my cage as I had

no idea what-so-ever what these creatures desired from me. All I knew was that I was completely powerless to escape my prison.

My assailant hung me in a bathroom with only one small window which was covered up by a shade preventing me from seeing the outside world. The window did not open therefore I was prevented from ever getting fresh air into the room or being able to perceive my outside environment. I had a sink in the room however only my captor were knowledgeable enough to turn the water on. Within the room was a toilet from which one can eliminate themselves but alas again only the captors were able to make the decision on when this toilet should be flushed.

My diet was rather boring as I received the same foods day in and day out. There was never any variety in my meals. If I felt sick there was no one here who would know how to help me so I was left to suffer in great pain. My walls have no pictures on them, there is no television for me to watch, no computer was available and worse of all I had no companions here. There were no toys or activities for me so I had nothing at my disposal to help pass the endless days and nights. I was lucky at first for I had my mother to keep me company but now I am completely alone. This, my friend, is what my life felt like. This is where I spent every single day and night of my life until I too will end up dying as my mother did. I have no control over my life or my world at all.

I have no control at all. I am not afforded the opportunity to decide the events which take place in my daily life, nor to determine what foods I will eat or when I get to take a drink of fresh water. I do not determine if I get any fresh air, there are no companions to comfort me or to enrichment my life. I will never have offspring of my own and my life span has decreased from the normal span of 25 years to ten at best.

I am the victim of a horrible cruelty and it is inhumane to keep me and other bats in a cage. I cringe to think that this treatment might also be inflicted upon my fellow bats at some future time. I experience terror at all turns of my life, I eat substandard food and I experience undo loneliness and boredom. If you have a bat in captivity please let it go. You will feel better about yourself, the bat certainly will, and you will be ready for the bugs when the SHTF.

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## SECTION X

### HOW TO BUILD A BAT HOUSE BY MARK KISER

This simple one-chamber roost will give those beneficial bug-eaters a much-needed boost. Here's how to build a simple bat house.



#### Supplies and Tools Needed to Build a Bat House

1/2" x 30" x 36" sheet of exterior plywood (Don't use pressure-treated plywood; it's toxic to bats)

1/2" x 26" x 36" sheet of exterior plywood

1" x 4" x 40" board for the roof

Two 1" x 2" x 24 1/2" boards for interior frame

1" x 2" x 36" board for interior frame

Four 1" x 2" x 3" wood spacer blocks

Crosscut saw

Pocketknife

One quart of dark exterior water-based stain

53 1" exterior wood screws

Seven 1 5/8" exterior wood screws for the roof

Drill

1/2" drill bit for vent holes

3/32" drill bit for screw pilot holes

Countersink bit so screws are flush

Phillips screw driving bit

Two squeeze tubes of exterior, paintable caulking

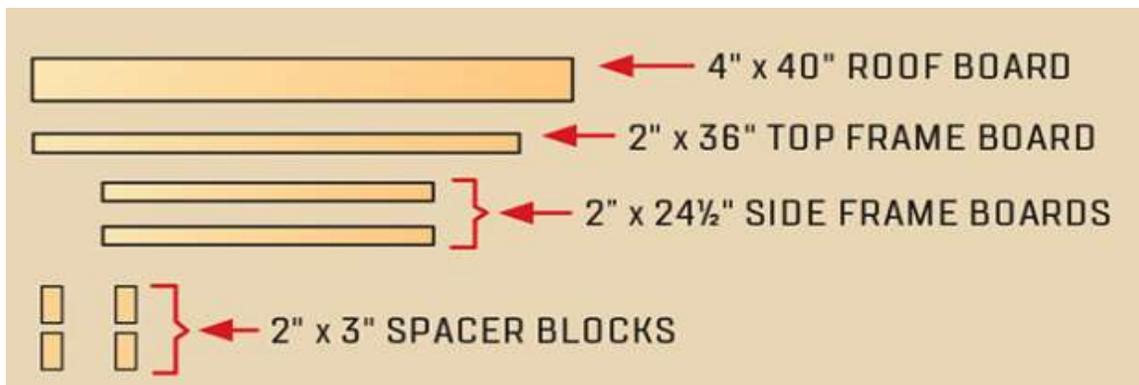
One quart of exterior water-based primer

Two quarts of exterior black or gray water-based paint

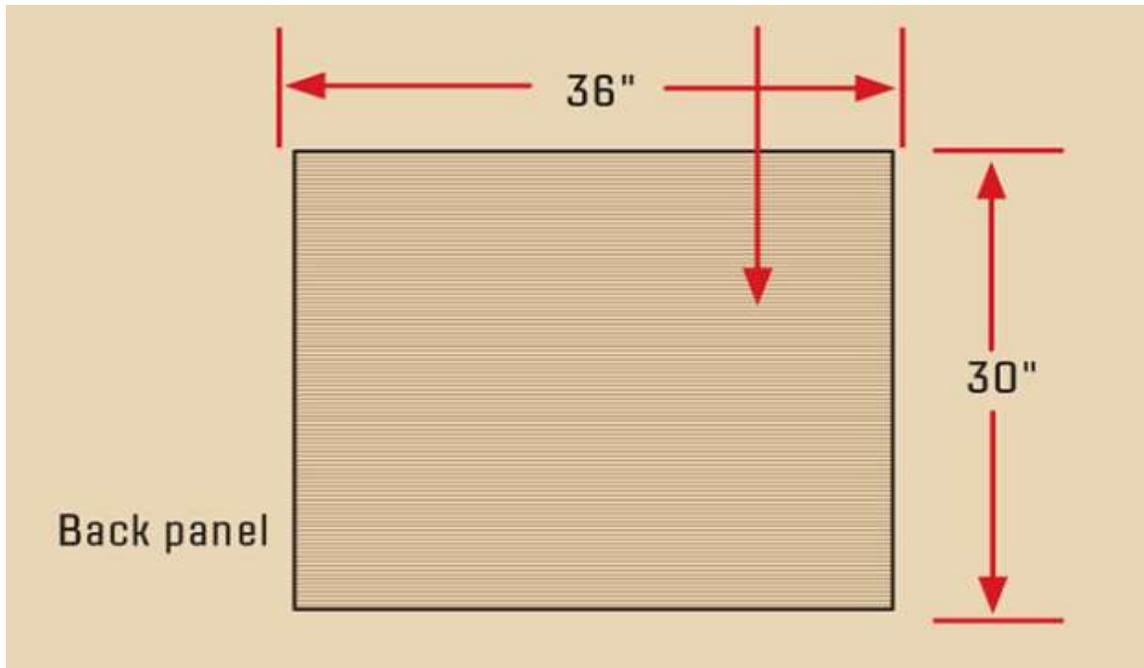
Paintbrushes

### Instructions

Step 1: Cut out all the bat house boards.



Step 2: Use your pocketknife to scribe shallow grooves (less than 1/16" deep) across the inside of the back sheet of plywood, about 1/4" to 1/2" apart. The grooves help bats grip the plywood.

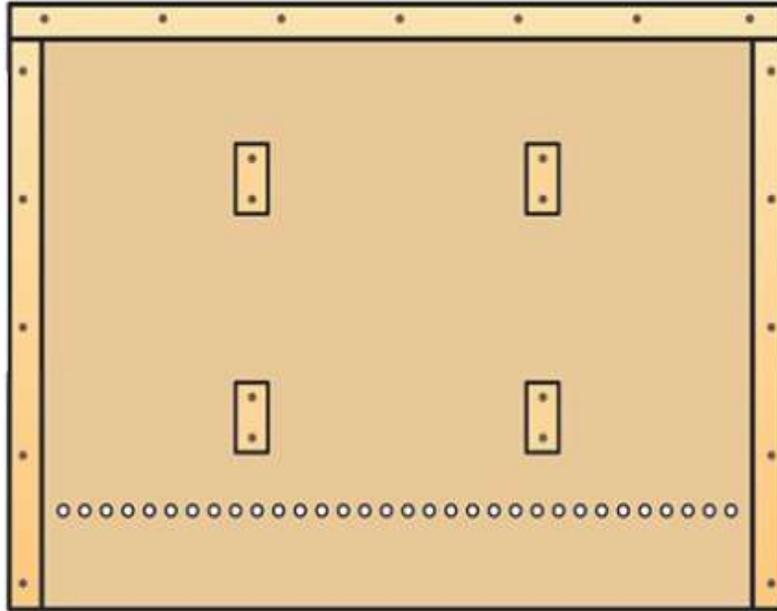


Step 3: Run a bead of caulk onto the contact surfaces of the interior frame and spacer blocks, and then screw them in place. All surfaces that are in contact with each other should be caulked before screwing them together. Caulking acts as a gasket, sealing out water.



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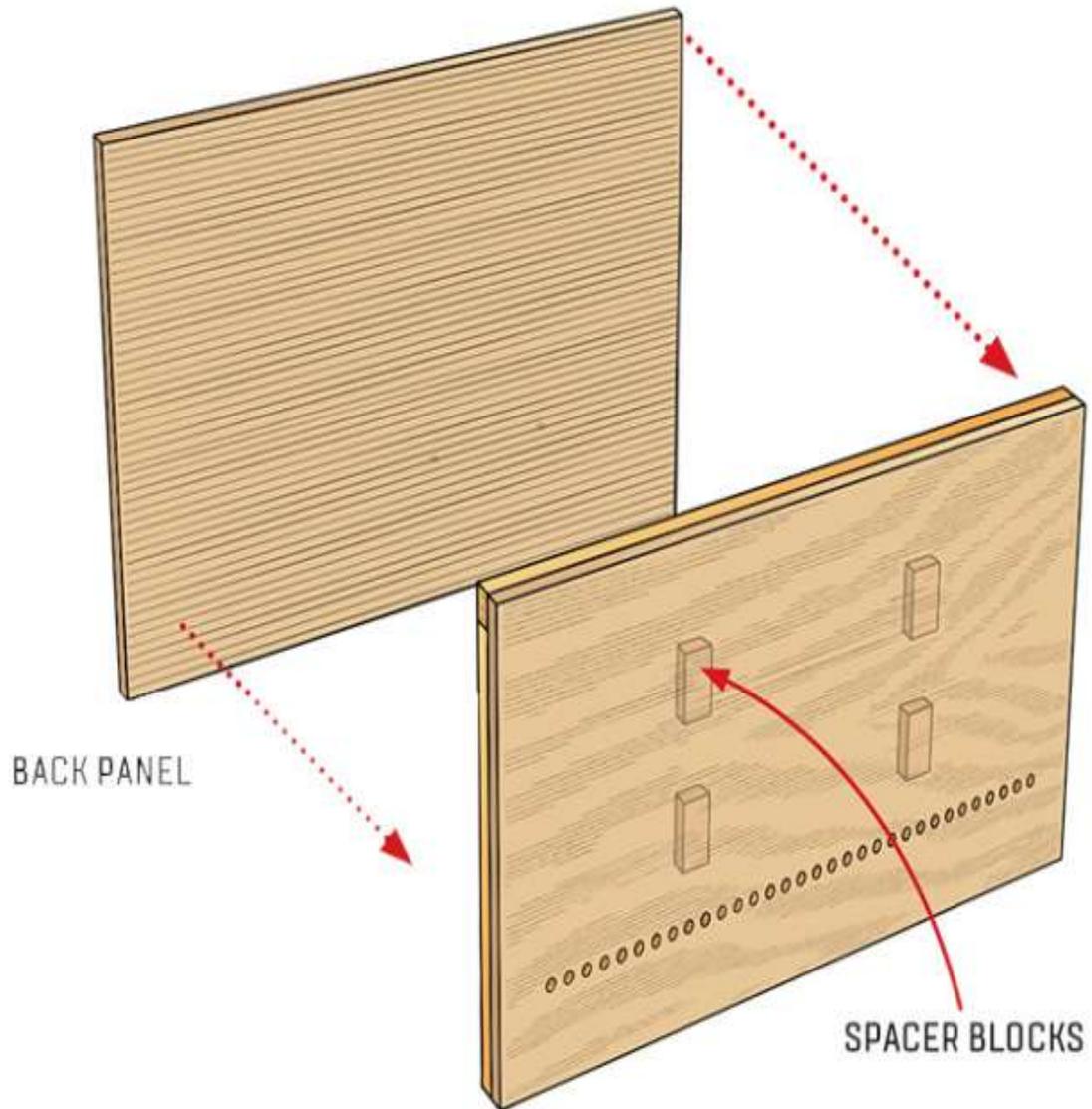
Step 4: Drill 1/2" vent holes. In cold climates, you need only three or four vent holes.



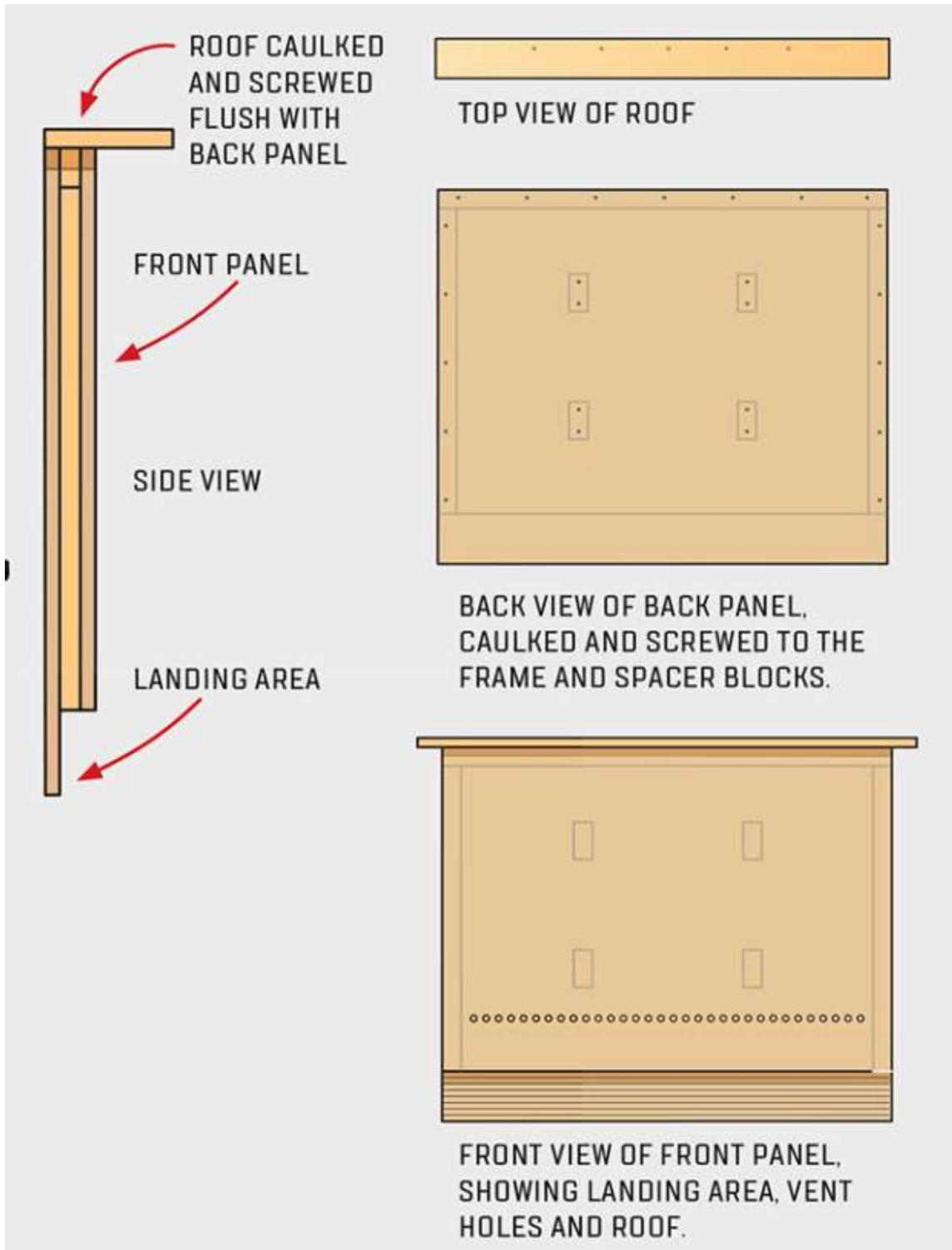
**BACK VIEW OF FRONT PANEL, SHOWING VENT HOLES.  
FRAME AND SPACERS ARE CAULKED AND SCREWED IN PLACE.**

Step 5: Stain the interior of the bat house, including the plywood, frame and spacer blocks. Allow the stain to dry.

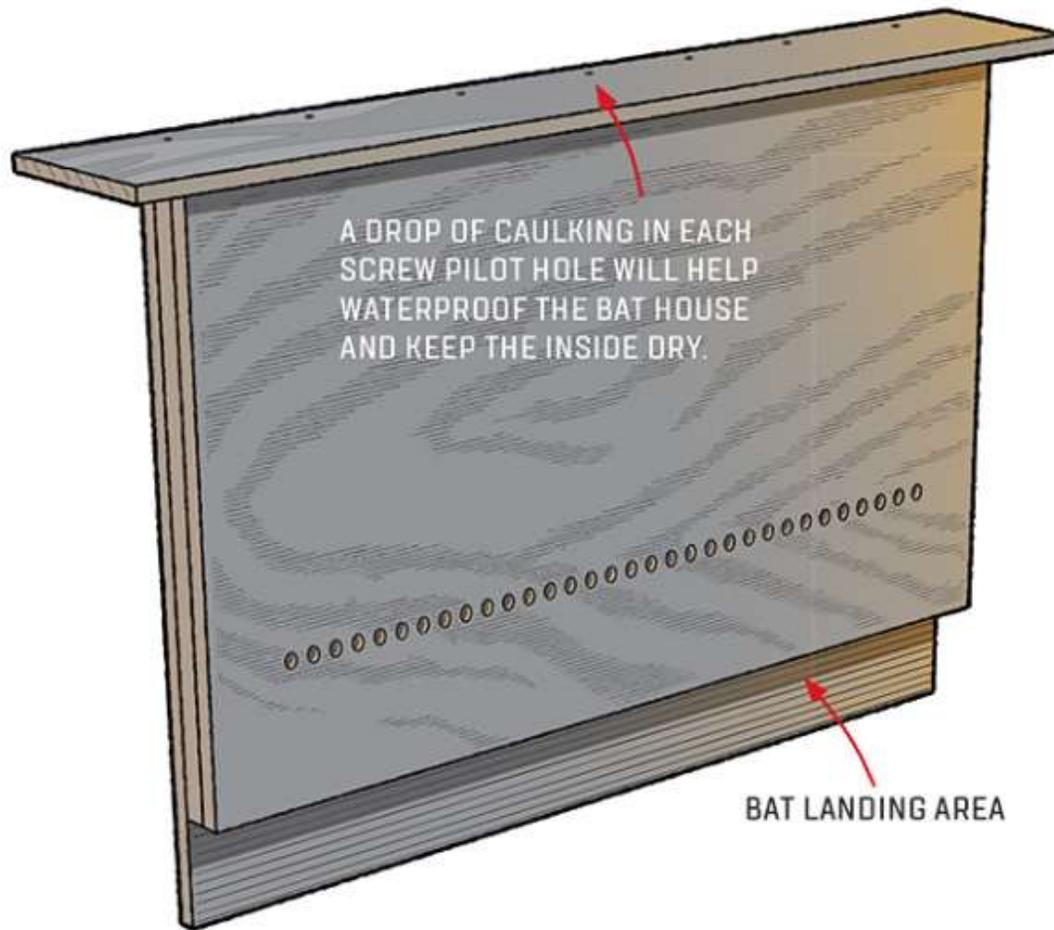
Step 6: Caulk and screw the back panel to the frame and spacer blocks. Be sure to drill pilot holes to avoid splitting.



Step 7: Caulk and screw on the roof. A drop of caulking in each screw pilot hole will help waterproof the bat house and keep the inside dry.



Step 8: Paint the exterior with primer, then apply two coats of paint. Use black paint for colder climates and gray paint for warmer climates. Attach the bat house to a building or other structure. Face it south or east, about 10' to 12' off the ground.



### Photos of Completed Bat Houses

Check out these photos of the completed project sent to us by Boys' Life readers.



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\* Please watch for my upcoming Bat book on Amazon.com within the next four months.