Maintaining & Monitoring Your Bee Hotel

Maintaining your bee hotel properly is essential not only for the health of the bees that use it, but it also extends the life of the nesting box itself. Since bee hotels have many tunnels close together, fungus and mites can spread more easily than they would in a natural environment. The easiest way to make sure your bee hotel remains clean and safe for our pollinating friends is to have two bee hotels. The first set would be used the first season, while the second set would be held in reserve until the following spring. You will not use the second bee hotel during the first year. The following spring you can place your second bee hotel outdoors. The initial box can be brought in and cleaned after the bees have emerged and left the bee hotel. You will be able to tell when the bees have emerged because the "mud or leaf cap" at the entrance of the tunnel will be opened by the emerging bees. The used bee box can be cleaned over winter so that it is ready to be placed out the following spring.

Depending on the materials you used in the nesting box, the method to clean it will be different. If you used paper or cardboard straws or plant stems, simply dispose of them and replace with a clean set. If you constructed a wooden nesting box use pipe cleaners that have been dipped into a bleach solution. For this method, you will mix half a cup of bleach into a gallon of water. Then cover the surface of the wood block with the solution. Then take your pipe cleaners, dipped in the bleach solution to clean out each of the tunnels. Let the bee hotel dry completely before placing it back out for bees to use. We hope this publication helps you turn your yard into a pollinator paradise!

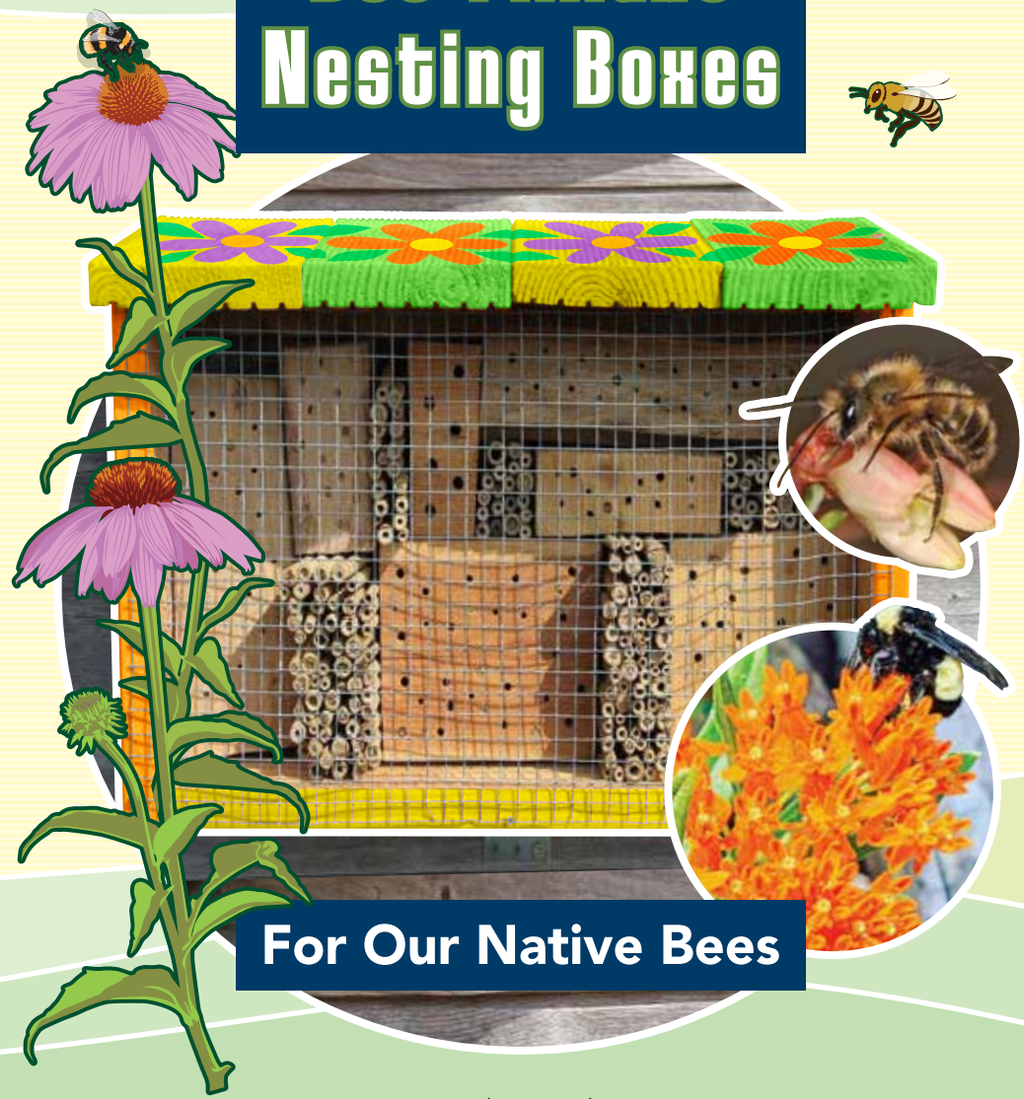
See *It's a Match!* on our website at NanticokeRiver.org for more information about native pollinators and what we can do to support their populations:

- **Plant more native plants – bees love them!**
- **Skip the chemical pesticides and herbicides.**
- **Convert some of your lawn to a pocket native pollinator meadow.**
- **Check out our homeowners guide for more ideas.**

Nanticoke Watershed Alliance
113 Old Ocean Gateway
PO Box 111
Vienna, MD 21869
410-443-8878
www.NanticokeRiver.org

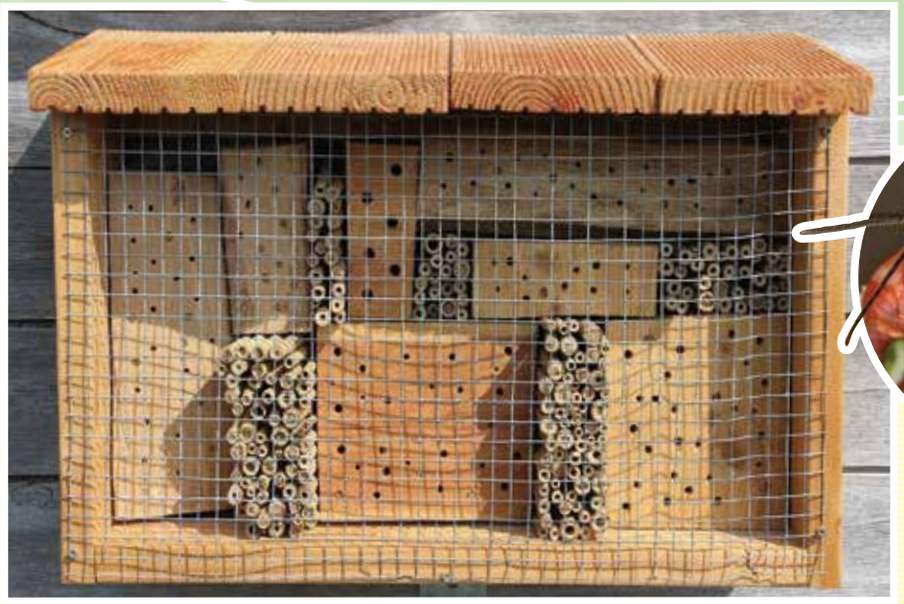
Printed on recycled paper.

Bee-rilliant Nesting Boxes



For Our Native Bees

Brought to you by:



Bee-rilliant Nesting Boxes for Our Native Bees

In this brochure we will talk about how to provide nest sites for native bees, including stem-nesting, ground-nesting, and cavity nesting bees. We will also provide you with a design for a bumblebee nesting pot. (Learn more about bees and other pollinators in our ***It's a Match!*** publication.) Bee hotels are used by solitary bees such as mason bees, leafcutter bees, sweat bees, and miner bees. They may also be used by friendly solitary wasps. A bee hotel or nesting box is a bird-house like structure that contains native bee nesting materials.

Pollinators are a diverse group of animals that are a vital part of a healthy environment. Providing a bee hotel in your garden provides crucial nesting habitat for our native pollinators and a means for you to experience the wonder of small insects carrying out their lifecycles. Bees are the most important group of pollinators. Like all wildlife, they have been impacted by human- made changes to our landscape, especially the loss of nesting sites. Providing a bee hotel or nesting box increases nesting habitat where it is scarce, such as in our urban human environments. Read on to learn how to build your own bee hotel or nesting box. ***The pollinators and your garden will thank you!***

Did You Know?

Providing a bee hotel in your garden provides crucial nesting habitat for our native pollinators. Many of our natural areas have been developed, leaving native bees with less habitat to reproduce and forage for food. Additionally, mown lawns with non-native landscaping provides very little benefit to our native bees. The addition of a small pollinator garden and a bee-hotel can make a big difference for our pollinating friends.

Building a Bee Hotel for Stem-nesting Bees

Stem-nesting bees construct their nests close to their preferred floral resources, so by providing a nesting box within your pollinator garden, you can help native pollinators boost their populations. There are two main kinds of stem-nesting bees: mason bees (*Osmia* species), which are active in the spring, and leafcutter bees (*Megachile* species), which are active in the summer. These two types of bees can be commonly found across the United States, making up about 30% of the 4,000 native bee species found in North America.

Mason and leafcutter bees build their nests above ground in cavities or tunnels, such as inside a pithy plant stem or pre-existing holes in trees. These types of bees are also solitary. Solitary bees make up about 90% of the 4,000 bee species that are native to North America. Rather than leading social lives, like honey bees or bumblebees, solitary bees provide for their own young and collect their own food without the assistance of others. Unlike honey bees, mason and leafcutter bees do not produce honey. Providing stem-nesting bees with nesting boxes (bee hotels) can help conserve their populations on farms, in home gardens, or in city parks.

Did You Know?

Decorating your bee hotel with bright paint colors can help attract bees from long distances to the nesting tubes and will protect the nesting box from the elements.

Solitary bees lay their eggs in small holes. The female bee will then lay her eggs into small compartments that she creates from mud, leaves, or plant resin. Before closing off each compartment, she will place enough pollen inside for the developing bees to eat until they are ready to emerge in their adult form. You will be able to tell if a female bee has laid her eggs in your bee hotel because the occupied cavities or tunnels will have a "mud or leaf door" to cover the entrance hole.

The materials needed for a bee hotel include:

- Hollow tubes to bundle (plant stems, bamboo, cardboard tubes, and paper straws)
- Tape, zip ties, string, or wire for bundling items together
- Scissors or pruning shears for cutting stems
- Nesting structure or house for rain protection (such as a plastic tote or constructed wooden frame)
- Wire mesh to protect from predators
- Paint to decorate (optional)

A leafcutter bee feeds on Joe-Pye weed.

How Do Bee Hotels Work?

STEP 1

Stem-nesting bees emerge from nests (tunnels or stems) created the previous year. Mason bees will emerge in the spring and leafcutter bees emerge in the summer.

STEP 2

The bees mate in the spring (mason bees) or in the summer (leafcutter bees). The females will be ready to lay their eggs inside the tunnels of the bee hotel.

STEP 3

The female bee surrounds each egg with pollen or nectar to feed her larvae. Next, she will lay each egg in its own compartment; separating each one from the next with leaves, mud, plant resins, or flower petals. For each successive cell, the female bee will collect more pollen and continue laying eggs until the tunnel is filled. Last, she will cap the end of the tunnel with mud and leaf pieces.

STEP 4

The eggs hatch into small larvae. They will eat the pollen left by their mother throughout the summer. Pictured below are mason bee larvae.

STEP 5

The larvae pupate and overwinter as pre-pupae or as adults. A few species have two generations within one summer, and these species will go through this process twice a year.

Location, Design, and Materials

A bee hotel should be hung in a location that is four to five feet above the ground and facing southeast if possible, so the hotel warms up earlier in the spring and stays warm later in the fall. The bee hotel can be mounted on the side of a building or a solitary tree, ideal locations where it is shielded from the wind, rain, and predators. Make sure the hotel is hung securely so it does not move or shake in the wind, which could disturb the developing larvae. Also, it is crucial that the nesting material does not get wet.

Mason and leafcutter bees can fly hundreds of feet to locate sufficient plants, so be sure to place your bee hotel near floral resources. It is ideal to have a variety of plants that bloom throughout the year. For example, maples, redbuds, or golden alexanders provide pollen for early emerging mason bees. Flowers that bloom later, such as purple coneflower, beebalm, or asters provide foraging resources for leafcutter bees.

This is where you can be creative! Build your bee hotel as big as you like and in any shape you want, just be sure it is enclosed in the back. While many may think bigger is better, consider constructing multiple, smaller bee hotels in order to minimize predation and disease. You will also want to use a variety of nest materials and stem diameters to help attract a diversity of bee species to your hotel.

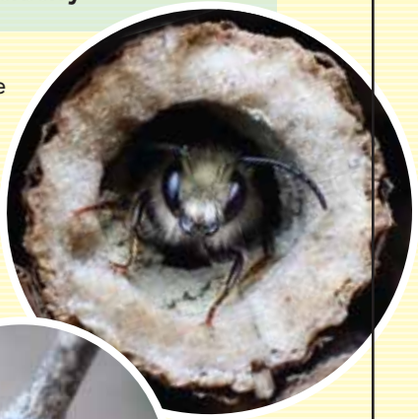
A simple nest can be constructed using bundles of hollow stems, such as bamboo, beebalm stems, or cardboard tubes and paper straws. The inside space of the stems should range from 1/16 to 1/2 inches in diameter. If you decide to use plant stems, each one needs to be cut below the node (see photo). This will leave you with stems that have one open end and one closed end, make sure all the open stems are facing the same direction. The length of the stems can vary depending on nest box design but should range between 5 and 8 inches. Next, tightly bundle the stems together using tape, zip ties, string or wire.

Alternatively, you can pack cut stems or straws into a container with one open end. Be sure to pack your straws or stems into the container with the open ends facing out of the container. This is a great opportunity to recycle old or unused items you have laying around your home. For the container, you can use a plastic tote turned on its side or you could construct a wooden frame to hold your nesting box materials. If you would like to create something a little smaller you can use aluminum cans, cement blocks, or PVC pipes. Remember to provide an overhang for your nesting box to protect it from the rain and wind.

Save perennial garden clean-up for spring. Many pollinators overwinter in different life stages: eggs, larvae, pupae, and adults. Some pollinators overwinter in the hollow stems of plants, while others attach to a plant or overwinter in the leaf litter. To protect overwintering pollinators, don't cut down your perennial gardens or meadows until April at the earliest and keep beds of leaves intact through the winter.

Plants with hollow or pithy stems:

- Large Aster Species
- Bee Balm
- Joe Pye Weed
- Sunflowers
- Raspberry and Blackberry
- Elderberry



A mason bee emerging from a stem.

A node on a stem.

Did You Know?

Provide native flowering plants close to your bee nesting boxes. This ensures that there are pollen and nectar resources available for the young, hungry bees emerging from their nesting box. Native wildflowers are best, wildflowers such as smooth penstemon, purple coneflower, wild bergamot, butterfly milkweed, New England aster, and black-eyed susan are all pollinator favorites.

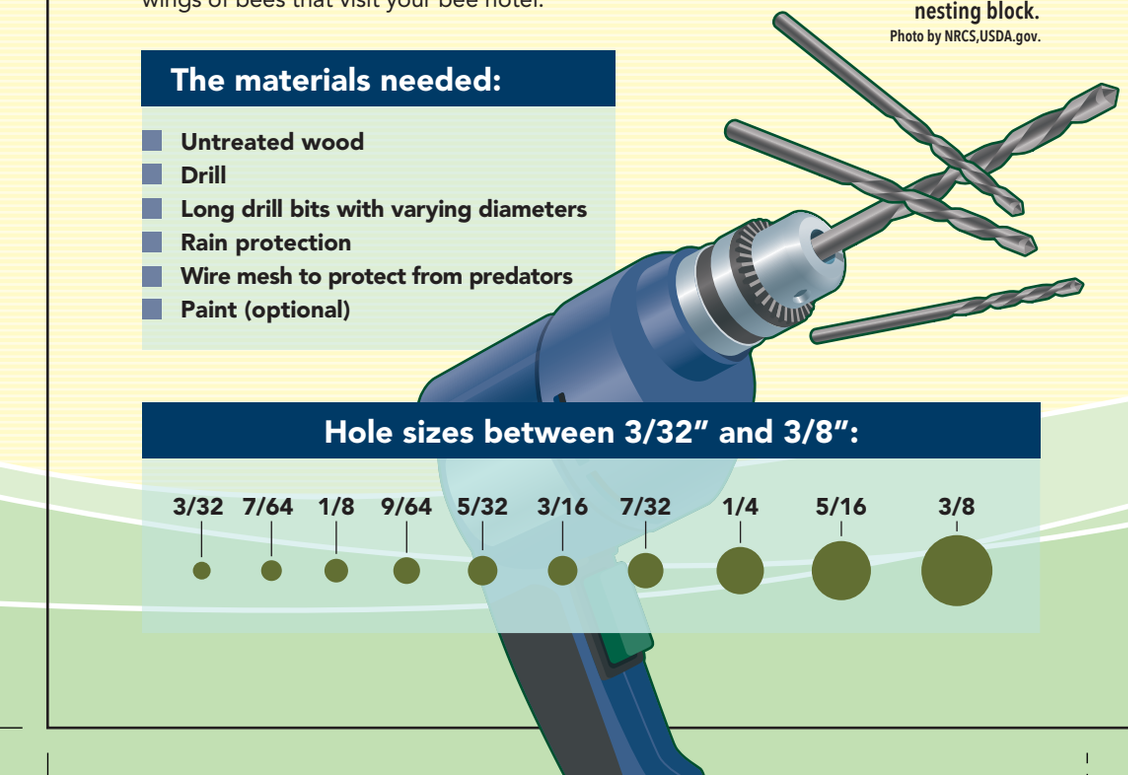
Constructing Wood Nest Blocks

In order to construct a wooden nest block, you will need untreated lumber, tree stumps, or logs that are at least 4 inches thick. On one side of your piece of wood, drill a series of holes that vary in diameter so you can attract a variety of bee species. The holes should measure between 3/32 and 3/8 inches in diameter and should be 3 to 6 inches deep. As the hole diameter increases, the depth of the tunnel should also increase. Most bees favor a closed-end stem so be sure not to drill completely through the back of the wood block. Also, make sure you drill your holes at least 3/4 inches apart to ensure the integrity of the wood block. When drilling make sure that your drill bit is sharp and drill at a high speed. This ensures the drilled holes will be smooth inside and will not cause damage to the wings of bees that visit your bee hotel.

A wooden nesting block.
Photo by NRCS,USDA.gov.

The materials needed:

- **Untreated wood**
- **Drill**
- **Long drill bits with varying diameters**
- **Rain protection**
- **Wire mesh to protect from predators**
- **Paint (optional)**



Hole sizes between 3/32" and 3/8":

Bumblebee Nest

Bumblebees are social bees. These large, fuzzy bees live in colonies and have different divisions of labor. Depending on the species and readily available resources, colonies usually consist of 50 to 500 individuals, including a queen. Unlike the nests built for solitary bees, there are no set size requirements for a bumblebee nest. You will need to make sure that the entry hole is large enough for a small colony of bees to fit through. In the spring, after emerging from hibernation, the bumblebee queen will search for a nest site, typically a dry, warm cavity to start her colony. In naturally occurring conditions, bumblebees will nest in abandoned mouse holes or under grass tussocks.

The materials needed:

- **Flower pot**
- **Piece of slate or tile**
- **Tube, pipe, or hose (perforated)**
- **Pine shavings and/or cotton string**

How to assemble a bumblebee nest:

1. Sink the upturned flower pot into the ground and use the slate or tiles to cover any drainage holes to keep the rain out of the nest box.
2. Run a hose or pipe underground to the pot, leaving a prominent entrance. Be sure to make drainage holes in the pipe so it doesn't fill with water and flood the nest box.
3. Lastly, fill the nest box with a handful or two of nesting material such as pine shavings or cotton string cut into various lengths.