

**Natural Resources
Conservation Service –
Caribbean Area**

Structures for Wildlife, Pollinator Box
Conservation Practice Standard 649, Practice Specifications

SCOPE

This specification serves as a guide to plan the selection and installation of a **Structure for Wildlife – Pollinator Box**. This document contains a list of considerations for the applicant and the NRCS requirements and constraints of this practice. It will be given to all producers who apply for NRCS financial and technical assistance to install a **Structure for Wildlife – Pollinator Box**.

The practice is specific to **tunnel-nesting bees** and consists of installing a pollinator box structure with the materials and to the dimensions shown on the drawings. Installed pollinator boxes will address wildlife habitat deficiencies where there is a lack of natural pollinator nesting areas and where artificial structures will enhance those habitats, *and/or* to attract and utilize pollinators or beneficial organisms to pollinate or control pests in crops, orchards, and other land-uses.

DEFINITION

A structure (*in this case a pollinator box*) installed to replace or modify a missing or deficient wildlife habitat component.



NRCS Structures for Wildlife - Pollinator Box.

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PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Enhance or sustain non-domesticated wildlife, or
- Modify existing structures that pose a hazard to wildlife.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all lands where planting or managing vegetation fails to meet the short-term needs for pollinator species under consideration. It also applies to situations where the [Caribbean Area Wildlife Habitat Evaluation Index \(WHEDI\)](#) identifies the need to:

- Provide loafing, escape, nesting, rearing, roosting, perching and/or basking habitat. Examples are nesting islands, nesting boxes, roosting boxes, rock piles, perching structures and brush piles.

GENERAL

Wildlife structures are normally established as supporting practices concurrently with other conservation practices as part of a resource management system. Where a change in management alone will not address the wildlife concern, supporting practices act as a catalyst to address the resource concerns. For example, where historic and/or current management practices have eliminated adequate shelter and cover for target wildlife, implementing additional practices can provide substitute cover and shelter until the plant community responds to that changed management. Installing nest box structures can provide needed nesting and roosting sites for secondary cavity nesting species.

Many bees naturally nest in beetle tunnels and similar holes in snags (standing dead trees). If snags do not pose a hazard, keeping them will provide habitat for bees as well as habitat for birds and other wildlife. In addition to nesting holes themselves, different bee species need different materials to construct brood cells and seal their nests. A few wood-nesting bees secrete a cellophane-like substance to divide brood cells, but most use gathered materials (Xerces Society, 2015).

Artificial nest box structures can be used to increase wildlife reproductive success in areas where natural nest sites are unavailable or unsuitable. Suitable nesting habitat for secondary cavity nesting pollinators is often unavailable due to current and past land management practices. Use of pesticides and loss of trees and snags where pollinators can build their nests contributed to the historic declines of different species of pollinators in woodlands, forests and the riparian areas that bisect these wooded areas. Many of these pollinator species can use artificial nest structures placed in woodlands, forests, riparian areas and even croplands.

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The most effective artificial nesting boxes are those installed in close proximity to food plots, adequate escape/concealment cover, a reliable source of water, and other elements of the target species' habitat. Predators, competitors, and territory sizes for individual species also influence the usefulness of nesting structures. Monitor and maintain nest boxes to limit competing or undesirable species, assess reproductive success, and allow landowners and managers to observe wildlife.

NRCS planners must use the Caribbean Area Wildlife Habitat Evaluation Index to indicate if there is a shortage of suitable nesting sites. Other habitat features in the area will inform the planner as to the likelihood of nest success for the target wildlife species.

NESTING BOX ELEMENTS

Elements that affect the success of artificial nest boxes include construction materials, design, placement, installation methods, monitoring and maintenance. Refer to design considerations below.

Construction materials

Wood should be used for pollinator nest box construction. Wooden nest boxes are relatively inexpensive and easy to build. For that reason, pollinator boxes should be made of rough-cut cypress, cedar, or other rot-resistant wood. Cedar is the best choice. Boxes must not be built with wood treated with creosote, green preservative (a.k.a., "pressure treated"), or finishes that have pentachlorophenol as an ingredient. The outside backs of boxes and the post may be treated with wood preservative to reduce rot and extend their life. Boxes should not be painted or stained.

Nest box design

A pollinator nest box is large wooden box that has blocks of wood of various sizes inside it, with holes drilled into the blocks to provide nesting sites for pollinators (see Figure 1 on page 1).

It is best to use preservative-free lumber: a 4"x4" for blocks with holes narrower than ¼", or a 4"x6" for blocks with holes wider than ¼". A rough block of wood or a log also can be used, as long as it is deep enough for the hole diameter (see paragraph below). The height of the block is less important, although most are constructed at least 8". Using a hand drill and a variety of drill bit sizes (from 3/32" (3 mm) to 5/16" (9 mm)), drill holes as deep as possible into wood sections.

Holes ¼" or less in diameter should be at least 3" deep. Holes larger than ¼" in diameter should be 5" deep. This is because the female bee, who controls the gender of her offspring, always finishes the nest with a few male brood cells. Deeper holes ensure more space for female brood cells. Female bees provide a greater benefit to crops, since it is the female that visits flowers to collect pollen and nectar to provision her offspring (Xerces Society, 2015).

Locate the wood sections inside of a wood cage as shown in Appendix A and mount it on a 6-foot pole to simulate a beetle-tunneled snag. A variety of hole diameters will support a variety of

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different sized bee species. Please locate biggest holes ($\frac{1}{2}$ ") in the top of the wood cage. Because bees may avoid a rough interior, very sharp drill bits should be used, the drill should be set at the highest speed possible, and when possible, holes should be bored across the grain.

Other components that should be included in the nest box are bundles of hollow stems or woody “straws”. Bamboo is a good choice because their hollow stems are naturally blocked at the stem nodes (usually indicated by a ridge). Cut each stem below the nodes to create a handful of tubes, each with only one open end. Locate the tubes in open areas of the box between wood pieces.

All metal parts (nails, screws, hinges, etc.) should be stainless steel to reduce likelihood of rust. Wood screws or concrete coated nails are recommended for box construction. Galvanized nails should be avoided, due to their tendency to loosen with wood expansion.

Boxes should be firmly attached to a support post. Lag screws and washers are the preferred means to attach boxes.

If the goal of a restoration project is to try to maximize the production of native bees from nest boxes, then it is worthwhile to create multiple blocks (inside a wooded box), with each block drilled with a single tunnel diameter. This will make block maintenance easier. If, however, the goal is to improve the overall habitat for native bees with little follow up management, then we recommend drilling a variety of hole sizes into a single block of wood and putting it in the field (Xerces Society, 2015).

POTENTIAL TARGET SPECIES IN THE CARIBBEAN

One of the most common cavity-nesting bee species native to the Caribbean Area is the Antillean Carpenter Bee (*Xylocopa mordax*). They burrow a nest into hard plant material like dead wood. This species is an important pollinator for Caribbean agricultural products such as avocado, eggplant, pumpkin, pigeon pea, lemon, watermelon, and tomato.

The biggest threat to the Antillean Carpenter Bee is habitat loss due to rapid growth and development. There are several ways to help declining populations of the Antillean Carpenter Bee. The first is to maintain a natural habitat. This can be accomplished by managing the understory to maintain a desirable height for nests and food source. Leave snags (dead trees) standing and leave enough live trees so that normal mortality will provide enough dead trees for nesting sites for the Antillean Carpenter Bee. Another way to help conserve the Antillean Carpenter Bee is to build nest boxes.

LOCATION

Nest boxes should be placed near semi-shaded areas, meadows or along hedgerows next to open areas receiving the morning sun, with food and water nearby. Generally, nest entrances should face southeast, so that the bees can be warmed as quickly as possible in the morning. Nest boxes should be near crop areas if pollination is needed. Nest boxes for pollinators should also be located near trees, shrubs, herbaceous and water bodies. The boxes should be spaced about $\frac{1}{3}$ -mile

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apart. Place boxes 5 to 6 feet above ground to keep out predators and to raise them above cool moist air that may pool at night. Nest boxes also should be fastened securely so that they do not move in the wind (Xerces Society, 2015).

MONITORING

Pollinator nesting structures can be monitored throughout the year to track use and nest success, remove undesirable species and predators, and to clean the structure to make it available. Monitor the structure at least once per month. Nest checks should be completed quickly to minimize disturbance.

OPERATION AND MAINTENANCE

Whether nesting sites are wooden blocks in a box with twig bundles, or other wooden materials inside a box, the most significant maintenance issue is whether and when to clean out the holes. In general, cleaning will help to reduce parasites, fungi, and diseases that might affect the developing bees in their brood cells.

Monitor the structure periodically, at least once per month. Maintain the structure free of vegetation such as vines or limbs that are impeding pollinator access to the nest box. Periodically, clean the debris near and inside the structure. To clean the debris inside structure, use a delicate brush. To limit the build-up of parasites, replace the blocks (that are located inside the box) or re-drill the holes in the nesting blocks every three years.

Well-built nesting boxes can last 10-15 years if properly maintained. Removing spiders' nests frequently from the box is strongly recommended. Replacement parts and other repairs can be made to nest structures during annual maintenance checks.

Suggested number of boxes per acre:

- 1 to 5-acre farms: two to three boxes
- 5 to 10-acre farms: three to four boxes
- 10 to 20-acre farms: four to six boxes
- Farms 25 acres or more: consult with the Caribbean NRCS State Biologist

Additional information:

Seven ways to make your farm pollinator friendly:

1. **Use pollinator-friendly plants** in your landscape. Native shrubs, herbaceous and trees such as asclepias, lantanas, heliconia, and sea grapes can provide pollen or nectar, or both, early in spring when food is scarce.



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2. **Choose a mixture of plants.** Different flower colors, shapes, and scents will attract a wide variety of pollinators. If you have limited space, you can plant flowers in containers on a patio, balcony, and even window boxes.
3. **Reduce or eliminate pesticide use** in your landscape or incorporate plants that attract beneficial insects for pest control. If you use pesticides, use them sparingly and responsibly.
4. **Accept some plant damage** on plants meant to provide habitat for butterfly and moth larvae.
5. **Provide clean water** for pollinators with a shallow dish, bowl, or birdbath with half-submerged stones for perches.
6. **Leave dead tree trunks**, also called “snags,” in your landscape for wood-nesting bees and beetles.
7. **Support land conservation** in your community by helping to create and maintain community gardens and green spaces to ensure that pollinators have appropriate habitat.

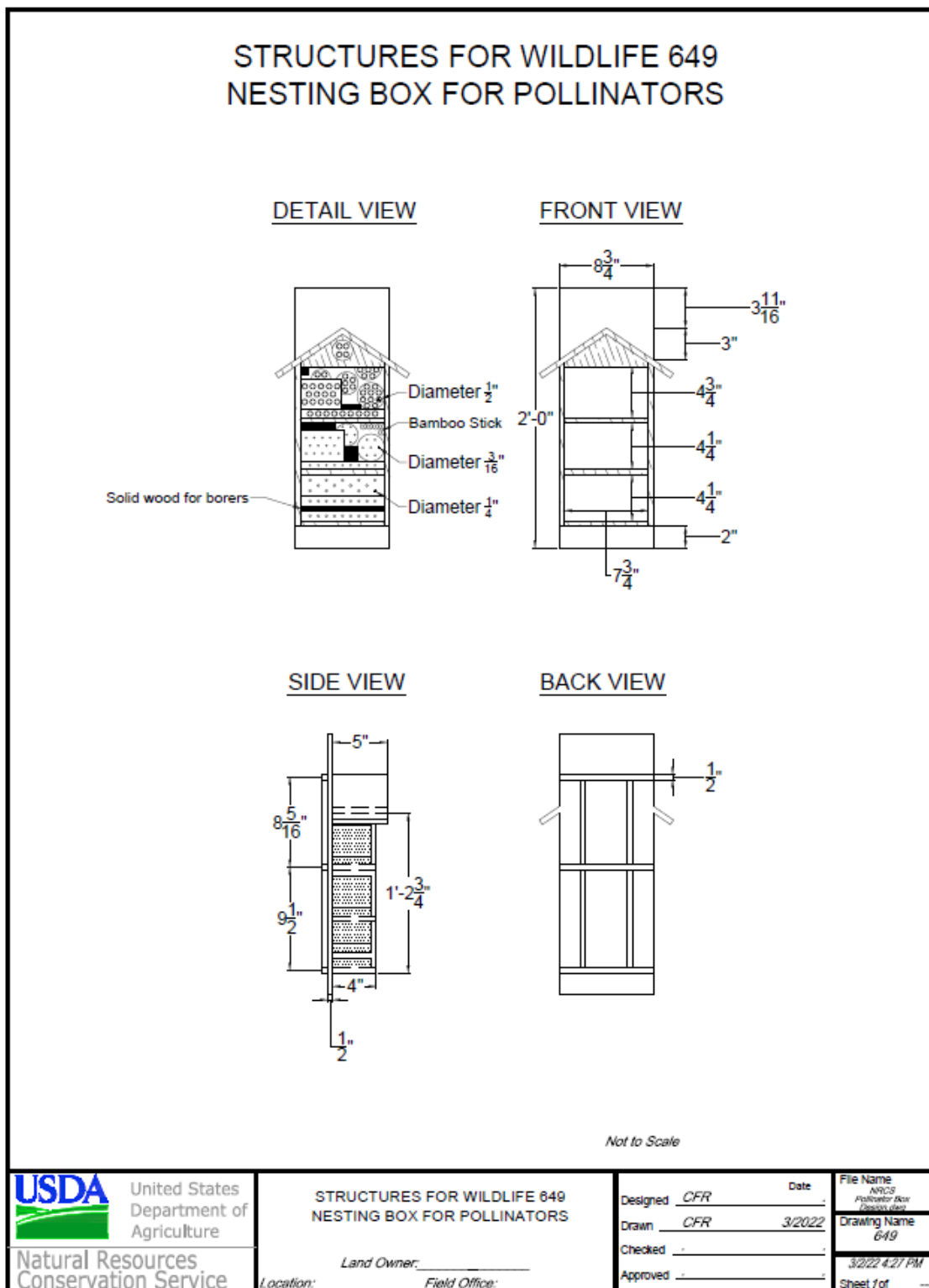
Please refer to Conservation Practice Standard 422 Wildlife Habitat Planting for information related to the recommended vegetation for pollinators in the Caribbean Area.



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APPENDIX A



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STRUCTURES FOR WILDLIFE 649
NESTING BOX FOR POLLINATORS

CAVITY SIZE

• All Objects will be 3 1/2" thick

CUTTING INSTRUCTIONS:

Not to Scale

United States Department of Agriculture Natural Resources Conservation Service	STRUCTURES FOR WILDLIFE 649 NESTING BOX FOR POLLINATORS	Designed <i>CFR</i>	Date _____	File Name NRCS Pollinator Box Design.dwg
	Land Owner: _____	Drawn <i>CFR</i>	3/2022	Drawing Name 649
	Location: _____ Field Office: _____	Checked _____	_____	3/222 4:27 PM
	_____	Approved _____	_____	Sheet 1 of _____



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REFERENCES

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5. USDA–NRCS, Agroforestry Note 34: “Enhancing Nest Sites for Native Bee Crop Pollinators.” Available at: <https://www.fs.usda.gov/nac/assets/documents/agroforestrynotes/an34g08.pdf>
6. USDA–NRCS Pollinator Conservation and Farm System Planning https://www.nrcs.usda.gov/wps/PA_NRCSCconsumption/download?cid=nrcseprd420278&ext=.pdf
7. Xerces Society. *Farming for Bees. Guidelines for Providing Native Bee Habitat on Farms*. 2015. www.xerces.org

Note: This document was created by NRCS Caribbean Area Biologist and reviewed by Dr. Alberto Puente (Professor from the University of Puerto Rico, Biology Department), Ramón Rivera (Biologist from the Puerto Rico Department of Natural and Environmental Resources (DNER)) and USFWS.