

# Nesting Structures

## Wildlife and People Profit from Nest Structures

Many people have fond memories of eastern bluebirds flying around the countryside busily gathering nest material or catching insects to feed their young. Unfortunately, some of us can also remember their decline. Widespread use of pesticides and elimination of trees and wooden fence posts that provided nesting cavities had all but excluded them from the scene 50 years ago. Fortunately, serious declines in many wildlife species, such as bluebirds, have been reversed by some peoples' fascination with these creatures. The placement of nesting structures in suitable habitat is an excellent example of human intervention having a positive impact on wildlife. Many cavity-nesting species can benefit from this management practice. Nest structures have not only played significant roles in enhancing the well being of wildlife, they have brought people and wildlife closer together. In order to make the most of this relationship, people should concentrate on finding the best habitat site and situation for particular structures.

## Habitat Requirements

Habitat preferences are unique to each species. Good sites supply food, water, shelter, and space. Insects should be plentiful for insect eaters, sources of seed for seed eaters, and soft fruits in summer and fall for wildlife to build up fat reserves for winter. Plants that provide food and cover in winter are essential. Sources of water year round sustain them.

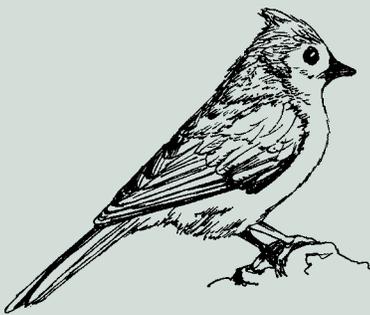
Spacing requirements also vary by species. Many wildlife species are territorial and will not tolerate intruders. Other species may be communal. It is necessary to understand the space requirements of the species for which you intend to erect structures. Bluebirds are intolerant of invaders. Nest boxes placed for them should be spaced 100 yards apart and be at least 100 yards from any buildings. This practice will reduce competition for nesting sites and reduce intrusions from less desirable species such as house sparrows and European starlings. Spacing nest structures 100 yards



Figure 1. Bluebird boxes are popular nesting structures for backyard habitat.



Figure 2. Erect bat boxes in shaded edges. Increasing bat populations will reduce insect problems.



*The placement of nesting structures in suitable habitat is an excellent example of human intervention having a positive impact on wildlife.*

apart, (one box per 2 acres of preferred habitat) is a good general rule of thumb for any species unless the species in question requires more space.

### Primary and Secondary Cavity Nesters

It is necessary to understand requirements of primary and secondary cavity nesters. Primary cavity nesters excavate their own cavities. Species such as woodpeckers and in some instances Carolina chickadees peck out cavities in dead or live trees with soft and/or rotten wood. When placing nest structures for woodpeckers, pack nest boxes tightly with wood shavings so they can excavate the nest cavity. Carolina chickadees usually excavate nest cavities, though it is not unusual for them to use existing cavities as well. It is not necessary to provide wood shavings for their nest structures. Secondary cavity nesters rely on the industrious habits of primary cavity nesters. Once the woodpecker has used the nest cavity, it will create another the following nesting season leaving the abandoned cavity for a chickadee, titmouse, flying squirrel, or other cavity-nesting creature.

### Nest Structure Do's and Don'ts

In order for a nest structure to be successful in attracting residents, careful attention must be given to its construction, its placement in an appropriate habitat, and the maintenance needed to keep it free of disease and pests. The following do's and don'ts apply to most nest structures:

- Build nest structures for a specific species. Each species has preferred structure dimensions and entrance hole sizes for safe and effective residency.
- Don't use tin cans, milk cartons, or metal for nest structures.
- Build nest structures using 3/4-inch dry, rough-cut cedar, oak, poplar, hemlock, or cypress.
- Assemble nest structures using galvanized wood screws, nails, or ringed-shank nails to keep boards from pulling apart.
- Don't paint, varnish, or treat the wood of nest structures in any way since such chemicals can be toxic to animals.
- Hinge a side or the roof of nest structures so reproduction can be monitored and the structures can be maintained.
- Provide drainage and ventilation holes in nest structures.
- Don't put perches on birdhouses. They encourage use by house sparrows and European starlings.
- Post nest structures such that the entrance hole is oriented away from prevailing winds so as to keep rain and snow out.
- Be sure nest structures are firmly attached to a support post, building, or tree depending on species requirements.
- Include predator guards on nest structures.
- As a general rule, space structures at least 100 yards apart. Exceptions to this rule would include communal nesters, such as purple martins, and species that require structures to be further apart.
- Remove small mammals, such as flying squirrels and mice, if they are unwanted. They have been known to kill birds returning to nest. If attracting these creatures is desirable put up additional nest structures.
- Remove wasps, bees, and blowflies. They will discourage,

parasitize, or kill inhabitants.

- Use wood shavings or wood chips for nesting material when species require it. Don't use sawdust.

### Predator Guards

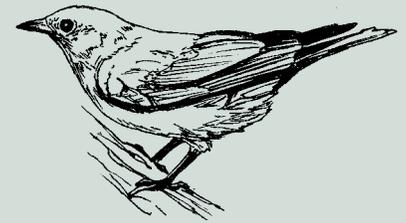
Whenever nest boxes are erected, predator guards should be included to deter predation. Whenever possible, it is best to mount nest boxes on poles. It is very difficult to protect nest boxes that are attached to trees or fences. By placing them on mounting poles and using predator guards, predation can be controlled. Metal conical pole guards 36 inches in diameter placed under the nest box pole work well for wood duck boxes. Stove pipe or PVC pipe placed around the mounting pole and attached to the bottom of the nest box is another acceptable technique. A relatively new technique that has had some success in dealing with snake predation on nest boxes involves the use of tack board from the carpet industry. Predation by snakes can be eliminated by placing the tack board up the mounting pole and on the front and top of the box spaced 1 inch apart with the sharp tacks pointing outward. This method should only be used as a last resort to solve a stubborn predation problem. On trees, predator guards can be made from 24 to 36 inch wide pieces of lightweight aluminum wrapped around the trunk above and below the nest box and nailed into place with roofing nails. If nest boxes are posted in trees, only cull (nonmerchantable) trees should be used.

### Pests, Predators, and other Problems

When providing nest structures for wildlife, it is important to remember that serious problems can arise that will jeopardize your efforts. Avian pests, mammalian predators, and other pests, such as insects, may pester, prey on, or parasitize adult birds, their young, and/or eggs at the nest box. It is necessary to check nest boxes frequently to ensure that these problems are kept under control.

There are two avian pests that must be controlled around nest boxes. They are house sparrows and European starlings. Both are aggressive competitors for nest cavities and cannot peacefully coexist with more desirable bird species. The house sparrow is perhaps the greatest threat to other cavity nesters. They may even prey upon adults, young, and/or eggs in order to get to a nest box. Once the nest box is claimed, male house sparrows form a strong attachment to the nest site. They claim them by stuffing the boxes full of nesting material, such as grasses, cloth, string, weeds, paper, and feathers. House sparrows are not native to North America and are not protected by law, so the nests can and should be removed. Any adults, young, and/or eggs should be humanely euthanized, frozen, then disposed of or donated to a wildlife rehabilitator as food for injured wildlife. Never place nest boxes around buildings in urban or rural areas. European starlings are another nonnative species that can cause problems. When posting nest boxes with entrance holes larger

*Use wood shavings or wood chips for nesting material when species require it. Don't use sawdust.*



*Birds are reluctant to use nest boxes that are occupied by pests such as wasps, ants, and blowflies.*



*Figure 3. A wood duck box and mallard nest structure placed in a moist soil unit.*



Figure 4. Sometimes a nesting structure will not house what you expected. This screech owl was taking residence in a wood duck box.

than 1-½ inches in diameter, it is important to monitor them for intrusion by starlings. As with sparrows, starlings are not protected by law and should be disposed of humanely.

Other unusual pests include wasps, ants, and blowflies. Birds are reluctant to use nest boxes that are occupied by wasps. Wasps begin building their gray, papery nests in early spring. Wasps have been known to roost in nest boxes before this occurs. It is best to deal with this problem on cool mornings in early spring when the temperature is 50 degrees or lower. Under these conditions, the wasps cannot fly or move quickly. Remove the wasp nests and crush the wasps with a putty knife. Repeat this procedure as needed. If the wasps persist, try rubbing petroleum jelly on the ceiling of the boxes to discourage the wasps from attaching their nests. Ants may also inhabit nest boxes and in some cases prey upon young birds. To prevent ants from accessing the nest box, heavy grease can be applied to the mounting pole. Blowflies lay their eggs in bird nests. When the eggs hatch, the larvae or maggots make their way up through the nest material during the night to feed on the blood of nestlings. When the oval, gray larvae pupate, they are 3/8 inch in length and appear as a black capsule. During the day, larvae/pupae can be found down in the nest material. To monitor the box for these parasites, gently pick up the nest and tap it lightly with the finger. The larvae/pupae will fall from the nest

Table 1. Structure Specifications & Requirements

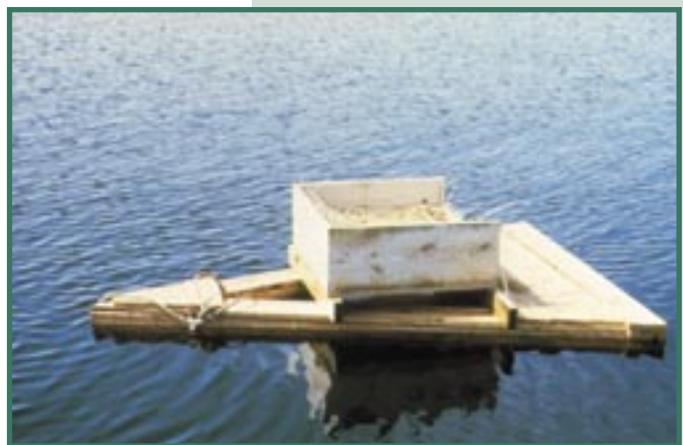
Species	Box Size	Hole Size	Hole Placement	Mounting Height	Habitat & Box Density
Bluebird	6"x 6"x 9"	1 3/8" x 2 1/4"	Front 6" from bottom	4' - 6'	Pastures, parks, golf courses, cemeteries. 1 per 2 acres; 100 yds. apart.
Carolina chickadee	6"x 6"x 9"	7/8"	Front 6" from bottom	4' - 6'	Woodlands, edges, semi-open farmland, suburban parks/yards. 1 per 2 acres.
House wren	6"x 6"x 9"	7/8"	Front 6" from bottom	4' - 6'	Shrubs, thickets. 1 per 2 acres.
Tufted titmouse	6"x 6"x 9"	1 1/4"	Front 6" from bottom	4' - 6'	Woodlands, edges, semi-open farmland, suburban parks/yards. 1 per 2 acres.
White-breasted nuthatch	6"x 6"x 9"	1 1/4"	Front 6" from bottom	4' - 6'	Mature forest, semi-open woodlands. 1 per 2 acres.
Carolina wren	6"x 6"x 9"	1 1/4"	Front 6" from bottom	4' - 6'	Rural and suburban open woodlands with brush cover. 1 per 2 acres.
Barred owl	12"x 12"x 24"	7"x 8"	Side 12" from bottom	20' - 30'	Mature hardwoods. 1 per 400 to 600 acres
Raccoon	12"x 12"x 24"	5"x 6"	Side Upper corner 18" from bottom. Next to tree	10' - 20'	Wooded/semi-wooded sites. Along streams & ponds; 1/4 mi. apart.
Wood duck	12"x 12"x 24"	3" x 4" oval	Front 18" from bottom	At least 20'	Wooded streams, ponds & wetlands. 50' from water; 100 yds. apart.
Screech owl	12"x 12"x 24"	3" dia.	Front 18" from bottom	At least 15'	Hardwoods & their borders. 1 per 200-300 acres.
Squirrel	12"x 12"x 24"	3" dia.	Side Upper corner 18" from bottom. Next to tree	At least 15'	Wooded/semi-wooded sites. 1 per 2 acres.
Canada Goose	No. 2 tub, 22" dia. or similar container	3"x 9"	Cut a 3"x9" opening in top edge of tub.	Post mount 3' above high water mark or use floating platform	Ponds & lakes surrounded by pasture or open areas. At least 200 yds. apart & 25' from shore.
Cottontail rabbit	18"x 18"x 12" burrow box; (can sub. D-box)	6" dia. PVC pipe.	Cut 2 6" openings in opposite sides of box. Place PVC pipe in openings at 45° angle	Bury in ground. Cover with brush pile.	Old fields, fence rows, field borders. 1 per 5-20 acres.

**Table 2. Breeding Information**

Species	Breeding	Nesting/Denning	Incubation/Gestation	Fledging/Dispersal
Bluebird	Mar. - June, eggs in April - June, double brooded	Existing cavities, build nest in 10-11 days, by female.	4-5, (2-7) pale blue, occ. white eggs, 12-14 day	15-20 days
Carolina chickadee	Mar. - May, eggs in April - May	Existing cavities or excavated in snag. Lined with moss, grass, plant down, feathers, hair.	6, (5-8) white eggs marked reddish brown, 12-14 days	17 days
House wren	April - July, eggs April - July, double brooded	Existing cavities, nest of twigs, grass, lined with fine materials.	5-7, (4-8) white to buff eggs with fine speckling, 13-15 days	12-18 days
Tufted titmouse	Mar. - May, single brooded	Existing cavities, lined with moss, fur, bark, leaves, grass, snake skin.	6, (4-8) white eggs marked with brownish speckling, 12-13 days	15-16 days
White-breasted nuthatch	Mar. - May, eggs in Mar. - June	Existing cavities, lined with soft bark, feathers, hair.	8, (5-10) white to pinkish eggs with reddish brown speckling, 12 days	14 days
Carolina wren	Mar. - July, eggs in Mar. - July, double to triple brooded	Existing cavities of all types, nest of twigs, bark, leaves, grass, lined with fine materials.	5, (3-6) white eggs with reddish brown to gray speckling, 12-14 days	12-14 days
Barred owl	Jan - Mar., eggs in Feb. - Mar., single brooded	Existing cavities, no material added, abandoned hawk or crow nests, adds green sprigs.	2-4 white eggs, 28 days	42 days
Raccoon	Jan. - Mar., young Mar. - May	Existing cavities	Gestation 63-65 days, 2-7 young	1 year
Wood duck	Mar. - June, eggs in Mar. - June, single brooded	Existing cavities	10-15 white eggs, 28-30 days	Soon after hatching, flighted in 56-70 days
Screech owl	Mar., single brooded	Existing cavities	4-6 white eggs, 26 days	35 days
Squirrel	<b>Gray:</b> Jan. - Mar. & July, young in Mar. - Apr. & Sept.	Existing cavities, leaf nests	Gestation: 43-45 days, 3-4 young	60 days
	<b>Fox:</b> Jan. - Mar. & May - June, young in Mar. - Apr. & June - July	Existing cavities, leaf nests	Gestation: 44 days, 3-5 young	60-90 days
Canada Goose	Apr. - July, eggs in Apr. - July	Ground nests, man-made structures on or near water. Nest of dry grass, forbs, moss, sticks, aquatic veg. Nest lined with feathers, down during incubation.	4-10 white eggs, 25-30 days	Soon after hatching, flighted in 40-73 days
Cottontail rabbit	Jan. or Feb. - Aug., young in Feb. or Mar. - Sept.	Abandoned burrows, shallow depressions in fence rows, field borders.	Gestation: 30 days, 4-5, (3-8) young	21 days

and should be removed. If heavy infestations occur, build a nest from grasses, place the nestlings in it, and discard the old nest material. Normally blowfly parasitism does not kill the birds, however during large infestations, death can occur.

Nest predation can be a serious problem in areas where raccoons, house cats, and even snakes are plentiful. Raccoons can become major predators at nest boxes. They will climb up poles, trees, and fences to get at nest boxes. Look for signs of nest material pulled out the entrance hole, feathers and pieces of eggshell scattered on the ground below the nest box, and claw marks on the box. Cats can climb poles, trees, and fences to reach adults, young, and eggs in the nest box. They will reach into the box through the entrance hole to get at young



*Figure 5. Anchor goose nesting platforms away from the shore for predator control.*

## SUMMARY OF OPTIONS:

### Species Desired:

Songbirds, Squirrels, Owls,  
Raccoon, Wood Duck, Other

### Size of Nest Box:

6"x6"x9", 12"x12"x24",  
Other

### Type of Wood for Nest Box:

Cedar, Oak, Poplar, Hemlock,  
Cypress

### Size of Entrance Hole:

Varies with species (see table)

### Placement of Entrance Hole:

Varies with species (see table)

### Habitat for Nest Box:

Varies with species (see table)

### Mounting Height for Nest Box:

Varies with species (see table)

### Spacing/Density of Nest Boxes:

Varies with species (see table)

birds and eggs or sit on top of the box to prey upon adults. Cats will sit on the ground in front of the box and jump up to catch adults as they fly back to the box. Even snakes can become a problem at nest boxes. In Kentucky, the black rat snake will prey upon birds, their young, and eggs. They easily climb poles, trees, and fence posts to get to nest boxes leaving no sign of disturbance.

### \*Related *Habitat How-To* references:

Snags and Cavity Trees  
Timber Stand Improvement  
Streamside Management  
Brush Piles

### *Planning for My Property*



The Kentucky Department of Fish and Wildlife Resources does not discriminate on the basis of race, color, national origin, sex, religion, age or disability in employment or the provision of services and provides, upon request, reasonable accommodation including auxiliary aids and services necessary to afford individuals with disabilities an equal opportunity to participate in all programs and activities.

If you feel you have been discriminated against by this department, contact the Kentucky Department of Fish and Wildlife Resources Commissioner's Office, #1 Game Farm Road, Frankfort, KY 40601.

A portion of this publication was underwritten by the Forest Stewardship Program in cooperation with the Kentucky Division of Forestry.