



## USING NEST BOXES AND RELATED STRUCTURES

### FOREST STEWARDSHIP MANAGEMENT NOTE #24

#### INTRODUCTION

Putting up nest boxes and seeing them used by wildlife is one of the most satisfying conservation projects a landowner can undertake. Although only a small percentage of Michigan's total wildlife species can be attracted to nest boxes, the receptive species are a diverse group, ranging from wood ducks to bluebirds and white-footed mice to little brown bats. Furthermore, a number of other species can be attracted by constructing platforms and similar structures that encourage nesting or roosting.

This Note provides general guidelines for the construction and placement of nest boxes and related structures as well as specific placement recommendations selected species and groups. Sources of additional information are given.

#### GENERAL GUIDELINES FOR BIRD NESTING BOXES

##### 1. CONSTRUCTION

**DESIGN AND DIMENSIONS** - References #10 and #18 provide detailed information on construction and placement of nest boxes and related structures. The construction diagrams from Reference #10 are included in the Michigan SIP Standards and Specifications Manual (#11). References #8, 12, and 19 provide summary tables of birdhouse dimensions and proper placement heights. Perches are not recommended for any nest boxes, except purple martins.

**MATERIALS** - Materials should resist weathering and provide insulation from overheating. Wood is generally the best choice, provided it is thick enough (3/4 inch or more) to provide adequate insulation (#17).

**VENTILATION AND DRAINAGE** - In addition to the entrance hole, nest boxes should be ventilated to allow healthy air flow and to let some light in. Small holes may be drilled in the sides of the box near the top, or small gaps may be left between the sides and the top (#17). The bottom should also have small holes or gaps in it to allow water to drain out.

**COLOR** - To reduce the threat of overheating, nest boxes should be left as natural wood or painted with a light color. Bright colors may discourage birds (#17).

**CLEAN-OUT OPENING** - To allow cleaning (see below), nest boxes should be constructed so that the bottom or one of the sides can be easily opened or removed. But do not make it so easy that raccoons can open them.

##### 2. INSTALLATION

**HABITAT AND PLACEMENT** - Even the best designed nest box will not be used if it is located in the wrong habitat or placed in an unsuitable area within that habitat. Read the recommendations below, consult the References, and observe the birds in your area to determine appropriate habitats and nest box positions for the species you want to attract. Considerations for placement always include height above the ground, and may include what the box is attached to, which direction it faces, the presence or absence of nearby cover, and other factors.

**TIMING** - Nest boxes may be installed at any time of year, but it is best to put them out before the birds return in spring. Patience is required, however, as most boxes will not be used for a year or more (#16).

### 3. OBSERVATION AND INSPECTION

To observe nesting birds, start by sitting about 20 yards away from the box. As the birds grow accustomed to your presence you can gradually move as close as 15 feet without disrupting them (#16). If the adults stay away for more than 15 minutes, move away and start over.

If you have a box that can be easily opened, you may inspect the contents every day or two during the nest-building and egg-laying stages without disturbing the birds. During incubation do not go near the box. Three days after hatching it is again okay to check boxes every few days. Always try to check boxes when neither parent is nearby (#16).

### 4. PESTS

**UNDESIRABLE BIRDS** - Most birds prefer large entrance holes, but competition for nesting sites from house sparrows and starlings dictates that entrances be as small as possible for the species of interest. These two introduced species are very aggressive and tend to reduce populations of native songbirds. Starlings cannot fit through a round hole that is 1 9/16 inches in diameter or less, so a 1 1/2-inch hole is a good choice for most small birds. House sparrows are more difficult to deal with as they fit through smaller holes. They may eventually be discouraged by repeatedly removing their nesting material. Killing them is a more direct method of control that is often recommended (#16).

**PREDATORS** – Predators, such as raccoons, can be discouraged by two basic methods. First, you can make it harder for the predator to reach into the box by thickening the entrance hole with another layer of wood and/or by attaching dowels inside the box just below the entrance (#16). Second, you can try to keep predators away from the box by attaching bands or skirts of slippery material around the pole or tree the box is mounted on.

**5. ANNUAL CLEANING** - Birds are hosts to a variety of parasites but these are seldom a serious problem. Nevertheless, it is very important that nest boxes be emptied out annually after the nesting season to minimize the buildup of fleas, lice, and mites, etc. (#5). Ordinarily, emptying the contents of the box and scraping out any residue should be adequate. Washing boxes with detergent just before the nesting season is also a good idea. If parasite problems are found, steam or insecticides that are non-toxic to birds can be used.

### **RECOMMENDATIONS FOR SPECIFIC BIRDS (see #3,10,18)**

1. **BLUEBIRDS** - Suitable habitats for bluebird boxes include old fields, orchards, parks, cemeteries, golf courses, and other savannah-like areas. The best locations for the boxes appear to be from 3-5 feet above the ground on stumps or fence posts. Many successful designs for blue bird houses have been published over the years. A recent innovation is a horizontal slot entrance (#7).

2. **CHICKADEES, NUTHATCHES, AND TITMICE** - These species prefer woodlands and wooded yards. Anchor the boxes to tree trunks 5-6 feet above the ground.

3. **BROWN CREEPERS AND PROTHONOTARY WARBLERS** - These species prefer boxes with bark on the outside. Creepers favor heavily wooded areas, whereas prothonotary boxes must be placed over water.

4. **WRENS** - Wrens are not very picky about where they nest and they will accept nest boxes close to houses. The males build several nests for the females to choose from, so place several boxes in an area, preferably hanging from a partly sunlit tree limb at eye level.

5. **TREE SWALLOWS** - Good habitat for tree swallow nests are field edges and semi-open woodlands near water bodies. Attach nest boxes to dead, preferably large, trees as close as 7 feet apart.

6. **PURPLE MARTINS** - These large, colonial-nesting swallows do not live up to their reputation as mosquito control experts but their flight is fabulous to watch. The most attractive habitat for a martin house is a lawn or open field near a water body with at least 40 feet of unobstructed flying space around the house. Martins will use houses 10-20 feet above the ground on poles or hanging from wires. Houses should have good ventilation and drainage. Places to perch are helpful.

7. **GREAT CRESTED FLYCATCHERS** - This species may be attracted to nest boxes placed 10-20 feet above the ground in orchards, along the edge of fields or streams, or in pine trees in mixed conifer and hardwood woodlands.

8. WOODPECKERS - All woodpeckers excavate cavities to nest in, but in Michigan, only northern flickers and sometimes the red-headed and red-bellied woodpeckers accept nest boxes (#17). Flickers are more likely to be attracted by boxes that are roughened on the inside and filled to the top with coarse sawdust or fine wood shavings (nest cavity excavation is part of their mating behavior). Reference #6 gives a detailed description of Michigan's first documented successful flicker nest box.

9. OWLS - Barn owl boxes should be fastened about 15 feet up on a tree trunk, but it should be realized that barn owls are very rare in Michigan. Screech owl boxes are best located along the edges of fields or neglected orchards. Line the bottom of the box with 1-2 inches of wood shavings. Boxes in trees isolated from the woods are less likely to be taken over by squirrels. If you clean the box out in late spring after the owls have fledged, sparrow hawks may move in.

10. AMERICAN KESTREL - The American kestrel is the only hawk that will use a nest box. Place kestrel boxes 1/2 mile apart in grassy habitats, such as orchards or relatively open country. Mount the boxes on trees or free-standing posts 10-30 feet above the ground, preferably facing south or west. Place 2-3 inches of wood chips in the bottom of the box and install a predator guard on the tree or post.

11. DUCKS - Most ducks are open-nesters, but wood ducks, common goldeneye, common mergansers, and hooded mergansers will use nest boxes. Boxes should be installed on posts or trees a few feet above water or in woodland habitat 20 feet or more above the ground. Boxes in woodlands should be installed 30 feet or more from the edge of water bodies as raccoon predation seems to be more of a problem along the edge of water. Until recently, wood duck boxes were often clustered near each other to facilitate maintenance, but this practice has led to boom and bust population cycles. It is now recommended that wood duck boxes be placed far enough apart so one is not visible from another (#9).

## **PLATFORM STRUCTURES FOR BIRDS**

Some species that are not cavity nesters may be attracted by erecting platforms on which they can build nests or roost (#10 gives construction details and placement advice).

1. SPECIES OF BACKYARDS AND SMALL DECIDUOUS WOODLOTS that may be attracted by platforms include: American robin, mourning dove, barn swallow, and eastern phoebe.

2. SPECIES OF EXTENSIVE FORESTS that may be attracted by platforms include: great horned owl.

3. SPECIES OF AQUATIC HABITATS AND ADJACENT UPLANDS that may be attracted by platforms include: common loon (also see #14), double-crested cormorant, great blue heron, osprey, Canada goose, Forster's tern, and mallard. Reference #15 also gives nesting structure designs for wetland species.

## **STRUCTURES FOR MAMMALS**

1. BATS - Bats will not eliminate mosquitoes, but they do eat them, and because they feed at night when mosquitoes are most active, they are more effective predators of these pests than are birds. Bat houses located near water are the most likely to attract visitors. Bat do not build nests, but some may use boxes for rearing their young. More likely, however, bat boxes will be used as occasional roosting sites. Houses should be located 12-15 feet above the ground where entry is unobstructed. They may be attached to trees, or poles, but those attached to buildings have had the most success (#1).

References #10 gives construction plans and placement advice for bat houses and some companies sell ready-made models (see Resources). The use of bat houses is relatively new in this country, so landowners wishing to maximize the chances of attracting bats should contact Bat Conservation International (#1) for the latest information.

2. SQUIRRELS - Gray squirrels and fox squirrels readily adapt to nest boxes in yards, woodlots, and farm groves. Place houses at least 30 feet high on trees that are at least 10 inches in diameter. Squirrels use boxes most heavily in winter, and the entrance hole should face away from prevailing winter winds. One or two boxes per acre usually provides enough shelter.

Red squirrels and flying squirrels may also be attracted to nest boxes in a wide variety of habitats. However, red squirrels (and other species) are very aggressive at bird feeders and prey on the eggs and young of songbirds. Flying squirrels are nocturnal so they are seldom seen, but some people enjoy watching them at bird feeders at night.

3. MICE - Deer mice and white-footed mice will use many types of nest boxes intended for birds but they also provide excellent opportunities to observe nature. To discourage mice from overwintering in boxes you want birds to use in spring, leave the cleanout doors open until the birds return.

4. RACCOONS - Because they often prey on eggs and young of other species that use nest boxes, most nest box projects attempt to discourage raccoons (see above). If desired, however, raccoons can be attracted to take up residence in nest boxes. Boxes should be 10-20 feet above the ground in trees of at least 12 inches in diameter.

## **DO NOT FORGET NATURAL CAVITIES**

Artificial nesting structures are useful wildlife management tools, but landowners should not overlook the value of natural cavities (FSMN #28). It is also possible to create cavities in trees with drills (#8) or chainsaws (#15), or during logging operations.

## **REFERENCES**

FSMN #'s refer to other Forest Stewardship Management Notes in this series.

- #1 Anonymous. 1991. Bat Conservation International's official bat-house builder's plans. Bat Conservation International, P.O. Box 162603, Austin, TX 78716. 512/327-9721.
- #2 Anonymous. 1991. Birdhouse manufacturers and distributor directory. *WildBird* 5(3):52.
- #3 Anonymous. 1991. Homes for birds. Department of the Interior, U.S. Fish and Wildlife Service.
- #4 Anonymous. 1987. Help bring back our gems of blue. Illinois Department of Conservation, Natural Heritage Division, 524 So. Second St., Springfield, IL 62706.
- #5 Benton, A.H. 1990. Birdhouse bloodsuckers. What you need to know about fleas, lice, mites and other nest-box pests. *WildBird* 4(11):27-31.
- #6 Bower, A. 1993. Fledging flickers. *Jack-Pine Warbler* 70(6):1-11.
- #7 Braun, B.B. 1992. Bluebird returns with help from 'friends'. *TreeFarmer*, Winter 1992.
- #8 Decker, D.J. and J.W. Kelley. Undated. Enhancement of wildlife habitat on private lands. Cornell Coop. Extension Publication - Information Bulletin 181.
- #9 Fellman, B. 1993. The trouble with wood ducks. *National Wildlife*, Aug./Sept. 1993.
- #10 Henderson, C.L. 1992. Woodworking for wildlife. Homes for birds and mammals. Minnesota's Bookstore (MN Dept. of Administration Print Communications Division), 117 University Ave., St. Paul, MN 55155. 800/657-3757.
- #11 Michigan Department of Natural Resources, Forest Management Division. 1992. Stewardship Incentive Program (SIP) practice standards & specifications manual.
- #12 Michigan Department of Natural Resources, Forest Management Division. 1986. Birdhouse dimensions. Forestry Information Bulletin No. 10-6.
- #13 Michigan Department of Natural Resources, Wildlife Division, Natural Heritage Program. Undated. Homes for wildlife. Flyers include information on: bluebirds; house wren, black-capped chickadee, prothonotary warbler, white-breasted nuthatch, and woodland deer mouse/white-footed mouse.
- #14 North American Loon Fund. Undated. An artificial island for loons.
- #15 Payne, N.F. and F. Copes. 1988. Wildlife and fisheries habitat improvement handbook. USDA Forest Service Wildlife and Fisheries Admin. Rept. (unnumbered).
- #16 Shalaway, S. 1991. Birdhouse basics. *WildBird* 5(3):46-51.
- #17 Stokes, D. and L. Stokes. 1990. What's new in birdhouses? *WildBird* 4(6):32-26.
- #18 Stokes, D. and L. Stokes. 1990. The complete birdhouse book. Stokes Nature Co., 52 Nowell Farm Rd., Carlisle, MA 01741.
- #19 Wegner, K.F. 1984. Forestry handbook. Wiley and Sons.

## **RESOURCES (Sources of ready-made nest boxes):**

In addition to the list of nest box suppliers referred to above (#1), the following companies supply certain types of nest boxes:

Bat Conservation International, P.O. Box 162603, Austin, TX 78716. 512/327-9721. Bat houses.

Forestry Suppliers, Inc., P.O. Box 8397, Jackson, MS 39284-8397, 800/647-5368. Wax coated cardboard bluebird and wood duck boxes.

Plow and Hearth, 301 Madison Rd., Orange, VA 22960-0492, 800/627-1712. "Houses" for birds, bats, and butterflies.

The Nature Company, P.O. Box 188, Florence, KY 41022, 800/227-1114. "Houses" for birds and bats.

CITATION: Burnett, Christopher D. 1994. Using nest boxes and related structures. Michigan Forest Stewardship Management Note #24. Michigan Department of Natural Resources, Forest Management Division.

ACKNOWLEDGEMENTS: This project was supported, in part, by a grant from the Michigan Department of Natural Resources and the USDA Forest Service.