

Carpentry for Critters



KCD
King Conservation District

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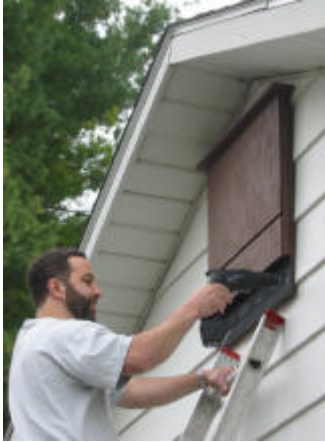
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Bat Boxes



Description

North American bats are invaluable natural resources. As primary predators of night-flying insects, bats play a vital role in maintaining the balance of nature. A single little brown bat can catch hundreds of mosquitoes in an hour. Bats that frequent bat houses eat insects that could damage crops, such as cucumber and June beetles, stink bugs, leafhoppers and corn worm moths. Most likely to inhabit bat houses are little brown bats, big brown bats, eastern pipistrelle and the eastern long-eared bat.

Habitat Most nursery colonies of bats choose roosts within 1/4 mile of water, preferably a stream, river or lake. Greatest bat house success has been achieved in areas of diverse habitat, especially where there is a mixture of varied agricultural use and natural vegetation. Bat houses are most likely to succeed in regions where bats are already attempting to live in buildings.

Design

All bat houses should be at least 2 feet tall, have chambers at least 20 inches tall and 14 inches wide, and have a landing area extending below the entrance at least 3 to 6 inches (some houses feature recessed partitions that offer landing space inside). Taller and wider houses are even better. Rocket boxes should be at least 3 feet tall and have at least 12 inches of linear roost space. Most bat

houses have one to four roosting chambers-the more the better. Roost partitions should be carefully spaced 3/4 to 1 inch apart. All partitions and landing areas should be roughened. Wood surfaces can be scratched or grooved horizontally, at roughly 1/4- to 1/2-inch intervals, or covered with durable square, plastic mesh (1/8 or 1/4 inch mesh, available from companies such as Internet, Inc. at 1-800-328-8456 or Aquamasters at 410-252-2079). Include vents approximately 6 inches from the bottom of all houses 24 to 32 inches tall where average July high temperatures are 85° F or above. Front vents are as long as a house is wide; side vents 6 inches tall by 1/2 inch wide. Houses 36 inches tall or taller should have vents approximately 10 to 12 inches from the bottom.

Protection from Predators Houses mounted on sides of buildings or on metal poles provide the best protection from predators. Metal predator guards may be helpful, especially on wooden poles. Bat houses may be found more quickly if located along forest or water edges where bats tend to fly; however, they should be placed at least 20 to 25 feet from the nearest tree branches, wires or other potential perches for aerial predators.

Avoiding Uninvited Guests Wasps can be a problem before bats fully occupy a house. Use of 3/4-inch roosting spaces reduces wasp use. If nests accumulate, they should be removed in late winter or early spring before either wasps or bats return. Open-bottom houses greatly reduce problems with birds, mice, squirrels or parasites, and guano does not accumulate inside.

*Excerpted and summarized from **The Bat House Builder's Handbook**, 2001 printing, © 1993 by Bat Conservation International, Inc.*

Materials

Tools Skilsaw with rip fence , hammer, tape measure, smoothing plane, stapler & 5/16" staples, heavy duty scissors, paintbrush, soldering iron with wood-burning tip (optional).

Other 1/4 sheet of 3/8" plywood (ie, 24"x 48"); 4' of 2x4 wood stud, 24"x24" of 1/4" mesh hardware cloth, 40 1.5" galvanized box nails; 2 cladding screws for mounting box, 30 3/4" brads; 120 ml multi-purpose white glue, 250 ml semitransparent wood stain; 6" galvanized pipe (for mounting) obtainable from plumbing shop.

Construction

Cut plywood to sizes shown on cutting diagram; note that one cut has to be made on a 30 degree bevel. Clamp one end of 2x4 tightly in vice so most of it

projects; set rip fence on skilsaw for a 1 3/4" wide cut (to centre of blade) and rip board lengthways down the middle for about 20". Cut off the two pieces formed to precisely 18 1/2" these will be the sides.

Re-trim the 2x4 end to remove the balance of the previous cut; adjust saw base plate to a 30 degree bevel, reset the fence for a 1" wide cut, and rip the projecting 2x4 again lengthways for another 22". Swing saw base plate back to normal (90 degrees) setting, readjust fence for 1" setting, and rip lengthways again to form a triangular fillet (see sketch). Trim to precisely 20". The 2 1/2" wide wedge will be the top, the triangular fillet forms the partial bottom closure, and the rest is scrap.

Place the top and side pieces together, rough-sawn edges inwards, like goal posts and cross bar; they can be held together temporarily with staples. Glue the back surfaces and nail the back in place. Make sure the bevel edge on the plywood back lines up properly, joints are tight, and edges are flush.

Turn the box over, cut the mesh screening to fit between the two side pieces (16 1/2" wide) and staple the mesh onto the inside surface of the back plywood. Glue and nail the larger of the two front pieces in place, again ensuring that the top bevel lines up nicely and the sides are flush. Cut the triangular fillet piece to fit between the two side pieces (16 1/2") and nail it, centered, to the bottom edge of the smaller front piece (see sketch). Turn the piece over and glue and nail it in place below the other piece, leaving a 1/2" gap for ventilation. Trim around the bottom landing board with the narrow strips of plywood to cover the sharp edge of the mesh attaching with 3/4" brads. Plane flush any projecting edges on top or sides.

Blow up the bat motif on a photocopier and trace onto the front of the box with carbon paper. Using a soldering iron with a fine, wood-burning tip, etch the outline into the wood (optional of course, but a nice touch).

Plane a bevel on the back of the plywood roof piece to match the roof angle (30 degrees) and nail the roof in place. Paint outside of box with semi-transparent stain.

Attach the hanging straps to each side as shown. Voila! Your very own bat box. How can bats resist it!

Notes For wooden houses, a combination of exterior plywood (ACX, BCX, or T1-11 grade) and cedar is best. Plywood for bat house exteriors should be ½-inch thick or greater and have at least four plies. Do not use pressure-treated wood. Any screws, hardware or staples used must be exterior grade (galvanized, coated, stainless, etc). To increase longevity, use screws rather than nails. Caulk all seams, especially around the roof. Alternative materials, such as plastic or fiber-cement board, may last longer and require less maintenance.

Wood Treatment For the exterior, apply three coats of exterior grade, water-based paint or stain. Available observations suggest that color should be black where average high temperatures in July are less than 85° F, dark colors (such as dark brown or dark gray) where they are 85 to 95° F, medium colors where they are 95 to 100° F and white or light colors where they exceed 100° F. Much depends upon amount of sun exposure; adjust to darker colors for less sun. For the interior, use two coats dark, exterior grade, water-based stain. Apply stain after creating scratches or grooves or prior to stapling plastic mesh. Paint fills grooves, making them unusable.

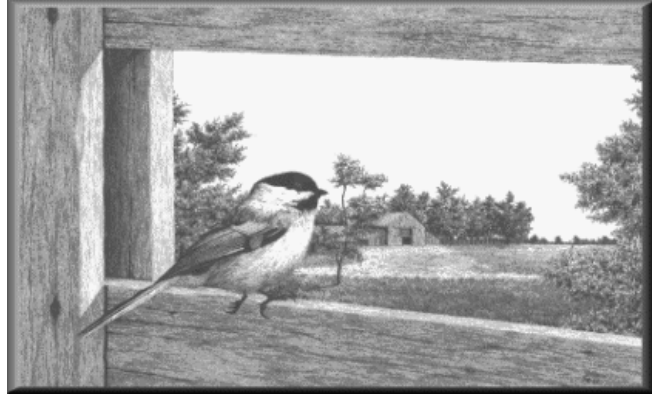
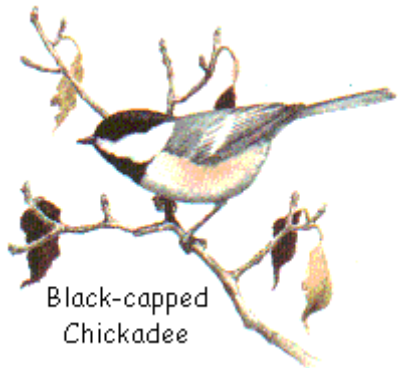
Sun Exposure Houses where high temperatures in July average 80° F or less, should receive at least 10 hours of sun; more is better. At least six hours of direct daily sun are recommended for all bat houses where daily high temperatures in July average less than 100° F. Full, all-day sun is often successful in all but the hottest climates. To create favorable conditions for maternity colonies in summer, internal bat house temperatures should stay between 80° F and 100° F as long as possible.

Mounting Bat houses should be mounted on buildings or poles. Houses mounted on trees or metal siding are seldom used. Wooden, brick, or stone buildings with proper solar exposure are excellent choices, and locations under the eaves often are successful. Single-chamber houses work best when mounted on buildings. Mounting two bat houses back to back on poles is ideal (face one house north, the other south). Place houses ¾ inch apart and cover both with a galvanized metal roof to protect the center roosting space from rain. All bat houses should be mounted at least 12 feet above ground; 15 to 20 feet is better.

Timing Bat houses can be installed at any time of the year, but are more likely to be used during their first summer if installed before the bats return in spring. When using bat houses in conjunction with excluding a colony from a building, install the bat houses at least two to six weeks before the actual eviction, if possible.

Excerpted from BC Naturalists www.naturalists.bc.ca

Chickadee Nest Box



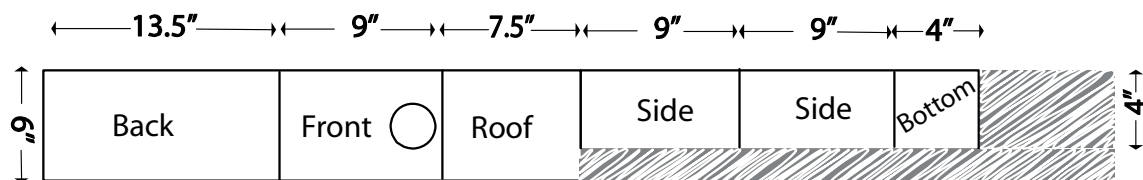
Description:

This chickadee birdhouse or nesting box is a great way to get started making birdhouses. You do not need to miter any edges and the entire project can be completed using one 6 foot length of 1" x 6" lumber.

Since only simple materials and tools are required, this birdhouse is also a wonderful project for Scouts, youth groups, and beginning woodworking classes.

Materials:

DIAGRAM A



Lumber: One 1" x 6" x 6'

- 1 Back 6" x 13.5"
- 1 Front 6" x 9"
- 1 Roof 6" x 7.5"
- 2 Sides 4" x 9"
- 1 Bottom 4" x 4"

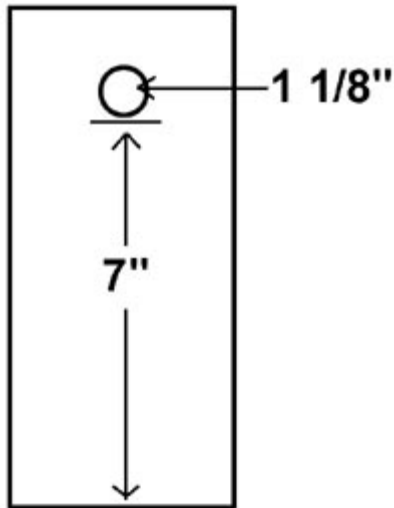


DIAGRAM B

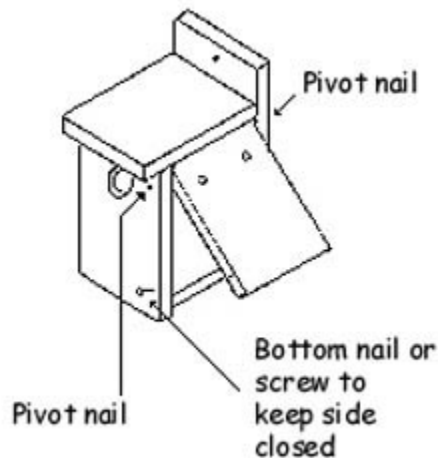


DIAGRAM C

Construction:

1. Cut the wood to the dimensions in Diagram A. All of the pieces can be cut from one 6' length of 1" x 6" lumber.
2. Cut the front entrance hole as in Diagram B. This is an oval shaped hole that is 1 3/8" wide and 2 1/4" long. To begin cutting this hole, mark the dimensions on the front. Then drill one 1 3/8" circle at the top. Repeat at the bottom of the hole, overlapping the drilled holes.
3. Drill two small holes near the top of each side for ventilation.
4. Drill four small holes on the bottom for drainage.
5. Using finishing nails or wood screws, secure one of the sides to the bottom. Then secure the front and back to the same side.
6. Slip the 2nd side into place. Secure using two nails, one near the top on each side. These nails will be pivots so make sure they are across from each other.
7. Reach inside the box and push the bottom of the 2nd side outwards, making sure it can pivot outwards. If it is too tight, remove the nails and sand the edges so it is a bit smaller. Repeat until the 2nd side will pivot outwards. See Diagram C.
8. Screw the eye screw near the bottom of the 2nd side. This screw is to make it easier for you to open the box occasionally to monitor it as well as to clean it out at the end of the season.
9. Drill a small hole through the front near the bottom into the 2nd side. Push a bent nail (I have a few by this point!) into the hole to keep the 2nd side closed. If you wish, use a small wood screw instead of the nail.
10. Nail or screw the roof to the nest box.

Mount the nest box to a pole, fence post, or tree. Be sure to use some type of predator guard to keep squirrels, snakes, raccoons, and other creatures from harming the nestlings.

Robin and Barn Swallow Nesting Shelf



Description

Robins, barn swallows, and many other birds do not use traditional birdhouses or nest boxes since they are not cavity-nesting birds. Robins nest in trees while barn swallows will build nests of mud, straw and twigs. Here is a wonderful and easy nesting shelf that American Robins, Barn Swallows, and Phoebe may use. This nesting shelf is a great way to help these birds out when there is a lack of nesting sites as well as to attract them to your backyard.

Materials

Wood cut to the dimensions below

CUT:

- 1 Back 4" x 6.5"
- 1 Front 4" x 1.25"
- 1 Roof 5.5" x 6"
- 2 Sides 5" x 7"
- 1 Bottom 4" x 4" NOTE: The dimensions are based on 1/2" plywood.

Hanger, Nails or wood screws

Construction

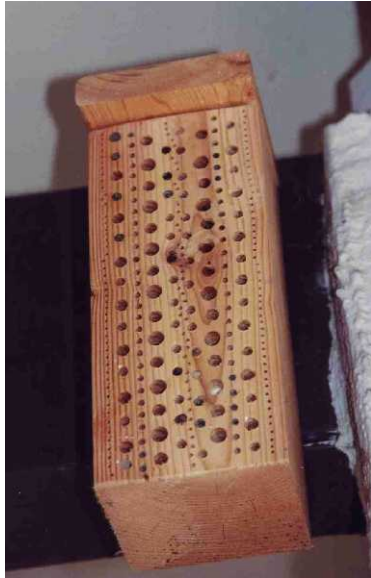
1. Cut the wood to the dimensions listed. The dimensions are based on 1/2" plywood. If you use a different thickness of wood, adjust the dimensions accordingly.
2. Using nails or wood screws, attach the front and back pieces to the bottom.
3. Using nails or wood screws, attach both sides to the shelf.
4. Nail or screw the roof to the nesting shelf so there is an overhang in front.
5. Attach the hanger to the back of the nesting shelf near the top.

Mount the nesting shelf to a pole, fence post, tree, or to your porch, deck or house. See "Common Specifications" page for correct mounting height.



Nesting shelf for barn swallows and American robins
C. Tarski

Mason Bee Boxes



Description: Mason Bees

- These black and blue bees are gentle and very rarely sting.
- They are solitary and do not live in a hive. They nest in small tunnels or holes in wood.
- Mason bees do not produce wax or honey but are wonderful pollinators for fruit and berries making them essential for gardeners.
- Mason bees are often confused with flies because of their size and coloring.

Materials:

- Pine or fir 4x4 cut into desired length (8" or more)
- Drill
- Hook or nail for mounting the bee house

Construction:

First build a Mason bee house by drilling a series of holes 5/16" in diameter and 3 3/4" deep and about 3/4 inches apart in pine or fir 4x4's.

- Paint and decorate the mason bee house (optional).
- Mount the house firmly to a fixed surface protected from wind and rain and facing a southeast direction to catch the morning sun. Ideally, loose soil or mud needs to be near the house for the bees to use as plugs for their nests.

Line each drilled hole with a large drinking straw. Once the bees have hatched, remove and discard the straws and replace with new ones for the next cycle of nest making

Notes:

Mason bees are native to most of the United States. They are gentle, non-aggressive bees that are used by farmers and gardeners for pollinating their fruit crops. They make a wonderful addition to any garden or backyard. Hanging the Mason Bee house is best done in the spring when fruit trees are just starting to bloom.

Once the bee house is hung, the female bee will lay eggs inside the holes and then plug the holes with mud. Inside the house, the bees are pupating into adults. Leave the house undisturbed throughout the winter. When the trees begin to bloom the following spring, you will be able to watch the Mason bees hatching from their nesting blocks. Mason bees are gentle, so you can closely watch them as they gather pollen and build their nests. The Mason bees will nest for about six weeks and then begin to die off leaving new nests for the following spring.

Brush Piles



Description

Wildlife have four basic requirements: cover, food, water and living space. Each must be present in an animal's habitat. Cover is the protective element within the habitat, which may come in different forms for various wildlife species. It may be a hedgerow for rabbits, a young hemlock thicket for deer, a spruce tree for a golden-crowned kinglet or a brush pile for small mammals and birds.

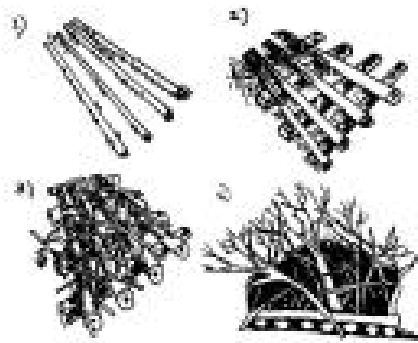
Whatever form cover takes, it contributes to one or more of the necessary functions in the lives of animals: breeding, nesting, hiding, resting, sleeping, feeding and traveling. When natural cover is limited in wildlife habitat, brush piles may be provided. If possible, brush piles should be a by-product of other land management activities, rather than a specific practice. Timber harvest, timber stand improvements, pasture or cropland clearing, and firewood cutting all provide woody limbs suitable for brush piles.

Location of Brush Piles Brush piles benefit wildlife most when they are located at the edges of forest openings. They should not be further than 10 feet from the woodland border. Other suitable locations for brush piles are along road edges, streams, marshes and yard borders within or next to woodlands. Four to eight brush piles per acre, spaced 100 to 150 feet apart, is a sufficient amount and will supply the needed cover requirements for most wildlife species.

Materials

Materials used in brush piles will depend largely on what is available. Oak, Maple, Cedar and other hardwoods which are rot resistant make durable bases. Other suitable materials include large stumps, cull logs, old fence posts and stones. The largest material should form the base and layers of smaller limbs and branches should be added as filler.

Construction



Brush piles are usually mound- or tepee-shaped, but can also be formed in “Log cabin” style. This is a type of layering technique that allows for space to be created inside the pile. Ideally, the piles should be six to eight feet high and 15 feet in diameter. An alternate method of providing cover is to windrow the brush along a stone wall or woods’ edge. In this case, brush should be piled in one direction with the tops facing the edge of the woods. Covering brush piles and windrowed brush with evergreen

boughs will provide wildlife with additional cover.

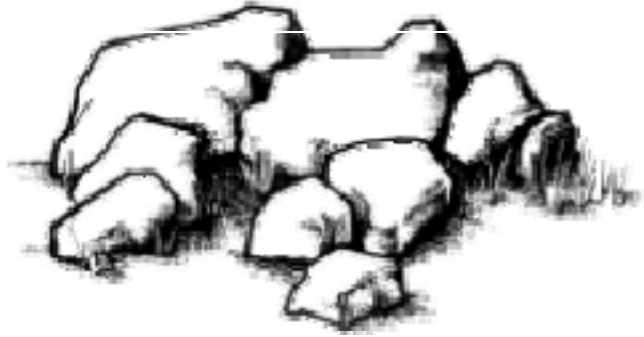
Brush piles are short lived (six to eight years). In order to provide continual cover, new ones should be developed periodically.

Notes

When properly constructed and located, brush piles can benefit many species of wildlife, including bobwhite quail, cottontail rabbits, ruffed grouse, wild turkeys, skunks, raccoons, opossums, woodchucks, chipmunks, mockingbirds, white-throated sparrows and juncos. Predators such as foxes, bobcats, hawks, owls and coyotes benefit from the small mammal and bird populations found in or around brush piles.

Grasses, forbs and vines, which are highly valuable to wildlife, will grow up through brush piles and add density and permanence to the piles.

Rock Piles



Description

Reptiles and amphibians have special adaptations that make it necessary for them to self regulate their temperature. This is why rock piles are so attractive to them: heat from the day is absorbed by rocks and slowly given off in the cooler evening. Conversely, stones are a cool, moist place to hide in the heat of the day. Small mammals are also attracted to the slugs and insects sheltered by stone piles, and occasionally take refuge under them as well.

Materials

Any available stones or rocks will do! A variety of sizes help to create different sized spaces between stones, giving access to a multitude of creatures. Larger spacing within the pile means access by larger animals, such as Cottontail or Opossum.

Construction

Pile rocks in any fashion you'd like. The deeper the pile, the more effective it will be for amphibians and moisture-loving creatures. Remember, you can also fill a pit with stones if tall piles will not fit your space. Broken concrete, roof tiles, even PVC pipe, can be a worthy addition to a rock pile.

Locating your pile in an area that receives sun and shade will give a good heat balance. If you live in a colder region, placing it next to another source of radiant heat will keep it warmer, longer. Masonry walls and chimneys are good

examples. In this case, placing the pile in an area that receives full sun will encourage use by reptiles like garter snakes. Piles located near water sources will tend to attract more amphibians and other animals with an affinity for moisture. Plants bearing fruit or food sources around the area will make your pile more inviting to use as shelter.

Remembering to leave ground level access holes increases the chance of usage by animals who also refuge in tall grass. To assure entrance passages, pay close attention to the first layer of the pile. Does it have large rocks that will make good sized cavities that lead to the outside? Is it sturdy enough to not cave in, blocking passage? With heavy stones, it is easier to get it right the first time than to recreate a pile!

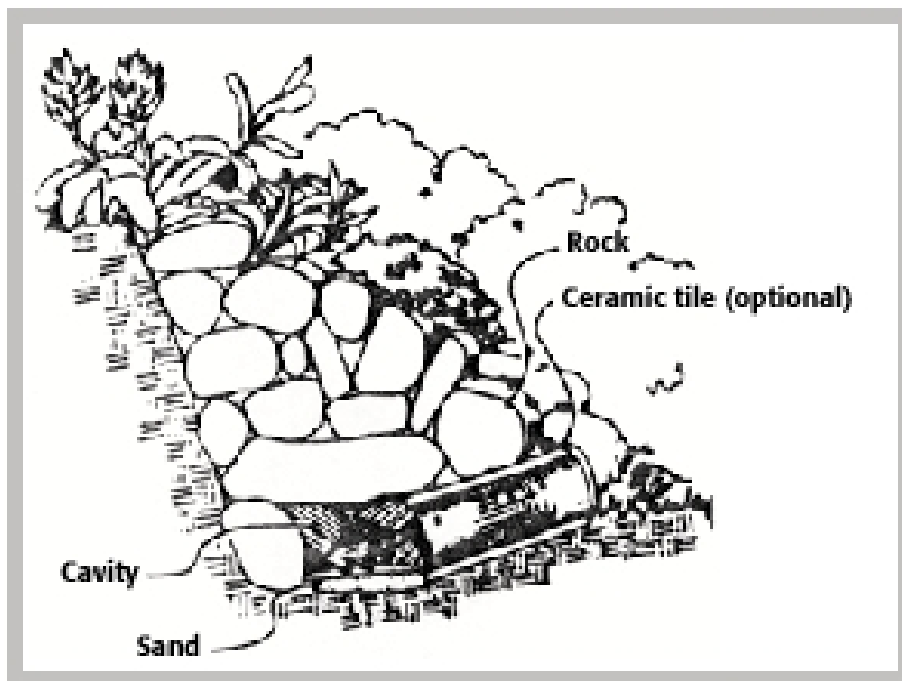


Figure 1. Example for constructing a rock pile.
(From: *Landscaping for Wildlife in the Pacific Northwest*, University of Washington Press and Washington Department of Wildlife.)

Raptor Perch



Description:

Birds of prey or "raptors" are meat eating birds that use their strong feet, talons and hooked beaks to catch and kill their prey. This group includes eagles, osprey, hawks, owls (Great Horned Owl), kites, harriers, buzzards, merlins, vultures, goshawks and condors. They eat small mammals such as mice and rabbits, fish, snakes, and even other birds. Some catch and kill their food and others (like vultures) feast on the leftovers other hunters leave behind.

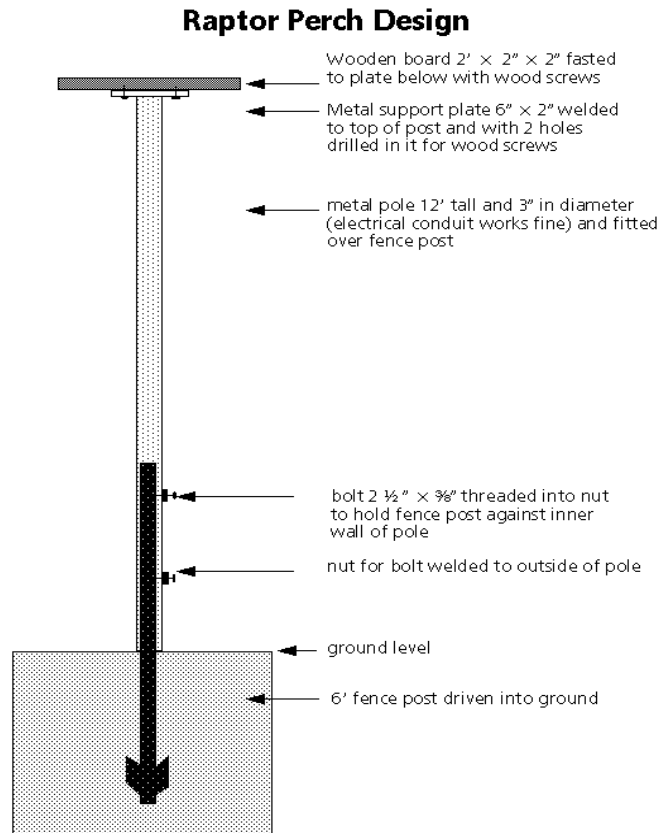
Materials:

- 1 --12-foot length of hollow metal pole (could be any type of scrap tubing or pole that is between 2 and 3 inches in diameter; we used 3 inch electrical conduit)
- 1 -- 2-foot length of 2" x 2" untreated pine board (edges rounded if desired)
- 1 -- flat metal plate approximately 6" x 2" x ¼ "
- 1 -- 6-foot long T-fence post
- 2 ---- wood screws to attach 2" x 2" pine board to flat metal plate
- 2 ---- bolts and nuts, 2 ½ " x 3/8" (length determined by diameter of pole).

Construction:

Perches should be assembled in a workshop according to the diagram below. The 2' length of 2" x 2" untreated pine board should be bolted to the 6" piece of flat metal that has been arc-welded to one end of the metal pole. Two holes 1/2" in diameter should be drilled in the pole approximately 12" and 24" from the bottom. Nuts for the 2 1/2" x 3/8" bolts should be arc welded to the *outside* of the pole in alignment with these holes.

To install the pole, drive the fence post about half-way into the ground, making sure it is vertical. Fit the pole of the bird perch over the post, with the post *inside* the pole. The pole should rest on the ground but not be driven into the ground. Coat the nuts with grease or other product to prevent rust, and then insert the 2 bolts into the nuts and tighten the bolts against the post; the post may have to be rotated so that the bolts rest against a flat portion of the post.



By Tod Fink, John Marlin, Patti Malmborg (modified by Illinois Natural History Survey shop staff)

Common Specifications

Description

Specification of birdhouses for several common species.

Species	House floor (inches)	House depth (inches)	Hole above Floor (inches)	Diameter of Hole (inches)	Height above Ground (feet)
Bluebird	5 X 5	8	6	1 1/2	5-10
Chickadee	4 X 4	8-10	6-8	1 1/8	6-15
Titmouse	4 X 4	8-10	6-8	1 1/4	6-15
Nuthatch	4 X 4	8-10	6-8	1 1/4	12-20
Bewick's Wren	4 X 4	6-8	4-6	1 - 1 1/4	6-10
Carolina Wren	4 X 4	6-8	4-6	1 1/2	6-10
Purple Martin	6 X 6	6	2	2 1/2	10-15
Crested Flycatcher	6 X 6	8-10	6-8	2	8-20
Flicker	7 X 7	16-18	14-16	2 1/2	6-20
Red-Headed Woodpecker	6 X 6	12-15	9-12	2	12-20
Downy Woodpecker	4 X 4	9-12	6-8	1 1/4	6-20
Robin	6 X 8	8	(1+ sides open)		6-15
Barn Swallow	6 X 6	6	(1+ sides open)		8-12
Phoebe	6 X 6	6	(1+ sides open)		8-12
Screech Owl	8 X 8	12-15	9-12	3	10-30
Wood Duck	10 - 18	10-24	12-16	4	10-20

Excerpt from About Birding, <http://birding.about.com/>



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