Build a Barn Owl Box

Modeled after an Original Design by Steve Simmons

Includes October 22, 2022 Plan Addendum

Natalia Daraselia, age 14, free-hand drawing from a published image.

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Revised:
February 27, 2012

Original Publication: August 2, 2010

Foreword to the 2012 Revision

This revision is prompted in part by feedback from those who've accessed and used the original 2010 article, and we thank them for their input. Improvements included in this revision are better dimensional metrics in the drawings; an expansion of the section *Entrance Hole and Grip Groove Dimensions* including a template for tracing, placing and cutting the entrance hole and grip groves; and an expansion of the section *Where to Place the Box* including a discussion of Barn Owl mortality rates. If you have questions about whether a Barn Owl box would be appropriate in your location, you might begin by browsing the section *Where to Place the Box*.

Foreword to the 2010 Original

The Barn Owl box plan documented herein was developed by Steve Simmons of Merced, California, and has been in extensive use since 1995 in the region near Merced in the northern end of the Central Valley of California.

Simmons has become a significant contributor to bird ecology through a massive program of building nest boxes, followed by studying the occupants via banding. An interest in wood duck populations led him to begin building and installing wood duck boxes along the Merced River in the early 1970s.

In 1991, he helped found the California Wood Duck Program, a volunteer organization which recently celebrated achieving half a million hatchlings. Simmons' personal boxes have produced over 68,000 wood duck hatchlings.

Steve Simmons 2010. *Photo by Charles Rettner.*

As a shop teacher, he organized the student production of over 10,000 Barn Owl boxes which were sold to local ranchers for pest control. The sales from the boxes provided over $168,000 in scholarship money for his students over a 9 year period. The farmers were grateful for the owl boxes because, in the few months between egg hatching and fledging, a clutch of six owlets consumes on average nearly 70 pounds of rodents.

Simmons with a display of mammal skulls collected from one nesting season in a Barn Owl box. *Photo by Charles Rettner.*

His personal monitoring of Barn Owl boxes (currently 200 annually at 8 sites) has led to an enormous amount of data on year round behavior, reproductive habits, diet, predators, habitat requirements, and nest box preferences. Simmons calculates he has climbed over 400 miles on his ladders. Over time he has expanded his studies to include Kestrels, Tri-color Blackbirds, bluebirds and Burrowing Owls (for which he builds underground nesting shelters).

For years Simmons has monitored hundreds of these Barn Owl boxes and banded over 14,000 owls to date. Working with students from the University of California at Davis, Washington State University, California State University at Chico, and the California Polytechnic University, he has noted Barn Owl courtship behavior, deciphered their diet, observed the competition between owls and other avian species, and experimented with variations in siting, mounting and designs of the box.

Contents

Photo by Lee Pauser.

Introduction

Barn Owls have been the subjects of wonder, wisdom, magical accoutrements, and folklore for ages. Their presence adds beauty and enchantment to the environment, and their significant rodent control skills comprise a very practical need for their presence. Habitat reduction has reduced their numbers over the last century, and an active program of owl box construction will help offset this.

An abundance of information exists[1,2,3,4] about Barn Owls and Barn Owl boxes. A broad search of internet sources will reveal an extensive amount of information on Barn Owls, including box designs. However, a perusal of these internet sites will reveal many conflicting descriptions of the habits and preferences of Barn Owls. The conflicts arise in part because Barn Owls are nocturnal creatures not easily studied, and the number of observations made for any one article is often very small. Consequently, much of the internet information becomes anecdotal.

An excellent, scholarly reference on Barn Owls is the publication titled *Barn Owls: Predator-Prey Relationships and Conservation* by Iain Taylor.[2]

A very interesting and touching book by Stacey O'Brien[4], *Wesley the Owl,* details her experiences raising a Barn Owl for a period of more than 15 years.

The Barn Owl box featured in this document is modeled on Simmons' proven design. The box is available commercially[3] but is easy to construct.

Simmons' Barn Owl box has many advantages. It provides optimized protection from predators such as Great Horned Owls and raccoons. This is achieved by use of an ellipse-based entrance hole of unique shape and size and by an interior divider that separates the box into two compartments. The divider, visible via a transparent front in the drawing provides a safe living area away from the entrance. Should a predator gain access to the entrance hole, it is unlikely that it will fit completely through

the hole, and the divider further prevents the predator from reaching around the divider to access the occupants.

Additionally, the placement of the entrance hole is such that younger owlets who congregate near the hole waiting to be fed will not be pushed out of the box by older and larger siblings lunging for food from behind.

The design omits perches or platforms in front of the entrance hole which would enable predators to perch during their attempt to snatch the box's occupants. Owlets likewise cannot perch outside the box and thus be exposed to predation.

Grooves (grip grooves) below the entrance hole assist adults entering the box.

The design includes two doors—an end clean out door and a top door which provides access to the interior during clean out and monitoring activities.

The box weighs about 23 lbs, much less than most other owl boxes in the literature. This provides for easier mounting.

An important attribute about this box is that the design has been tested in use by thousands of owls, an extremely unique situation. This provides comfort that the solutions presented here are not anecdotal but are applicable to a high percentage of Barn Owls.

For all of the above reasons, we have adapted this design for boxes at the IBM Almaden Research Center site in San Jose, CA.

Tool Requirements

For making a few boxes, the following list of tools and materials is usually sufficient:

- Safety goggles or safety glasses
- Hand saw, electric circular saw, or power saw (table, radial or miter)
- Scroll Saw or keyhole saw (to cut out entrance hole)
- Router with 3/8"straight bit to rout grip grooves (optional)[*]
- Tape measure
- Pliers (for turning the L screws)
- Carpenter square or tri-square
- Hand screwdriver or a battery powered portable drill
- Hand drill, battery powered portable drill/driver or screw driver
- Drill bits
    - 3/32" for screw pilot holes[†]
    - 5/32" for screw clearance
    - 5/16" for mounting holes
    - 1/2" for scroll saw starter, drain, and hanger holes
- Air nailer (optional)

[*] Alternatively, the grooves can be cut with a sharp chisel.

[†] Bit assemblies which include a countersink, a clearance section, and a pilot hole for screws are available commercially and are useful as the screw heads can then be set below the surface.

Materials

For parts having the dimensions in this design, exterior plywood and exterior siding which come in 4’ x 8’ sheets are the most practical materials. Plywood should be exterior grade, usually identified by “exterior” stamped on the surface or by the use of an X in a three digit designation such as “CDX” where C and D indicate the quality of the two surfaces and the X designates exterior use. Siding is designed for exterior use, but it is usually more expensive than plywood.

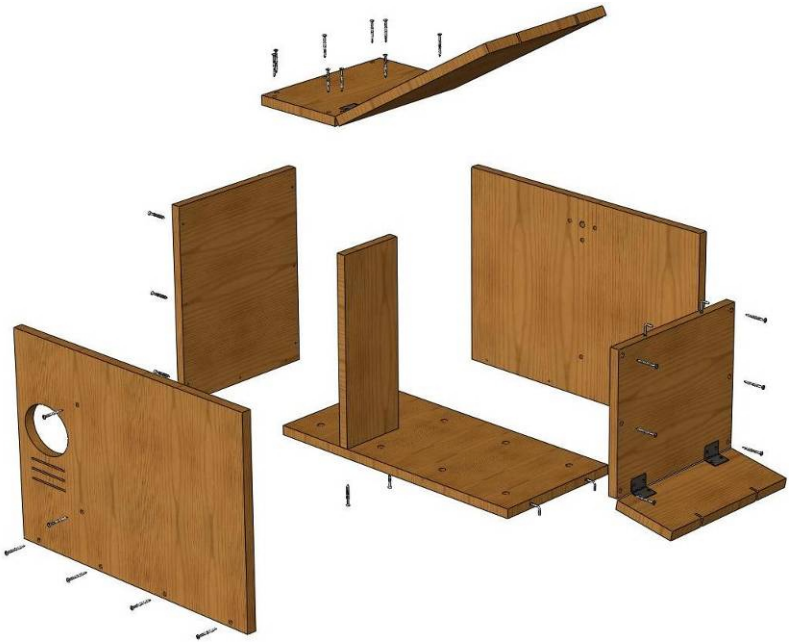
The dimensions assume a sheet material of labeled as ¾” plywood. Today’s industrial standards require that the product listed as ¾” plywood have an actual width stamped on the wood. Usually this is 23/32” but variations of +/-1/32” are allowed (and typically found) in any sheet. These differences have little impact in the actual construction of the box but should be accounted for in the width of the top.

An included *Cutlist* shows how to cut two boxes from one 4’ x 8’ sheet of plywood, and it takes into account in the dimensions a slight top overhang and the saw kerf (width of saw blade).

Materials List

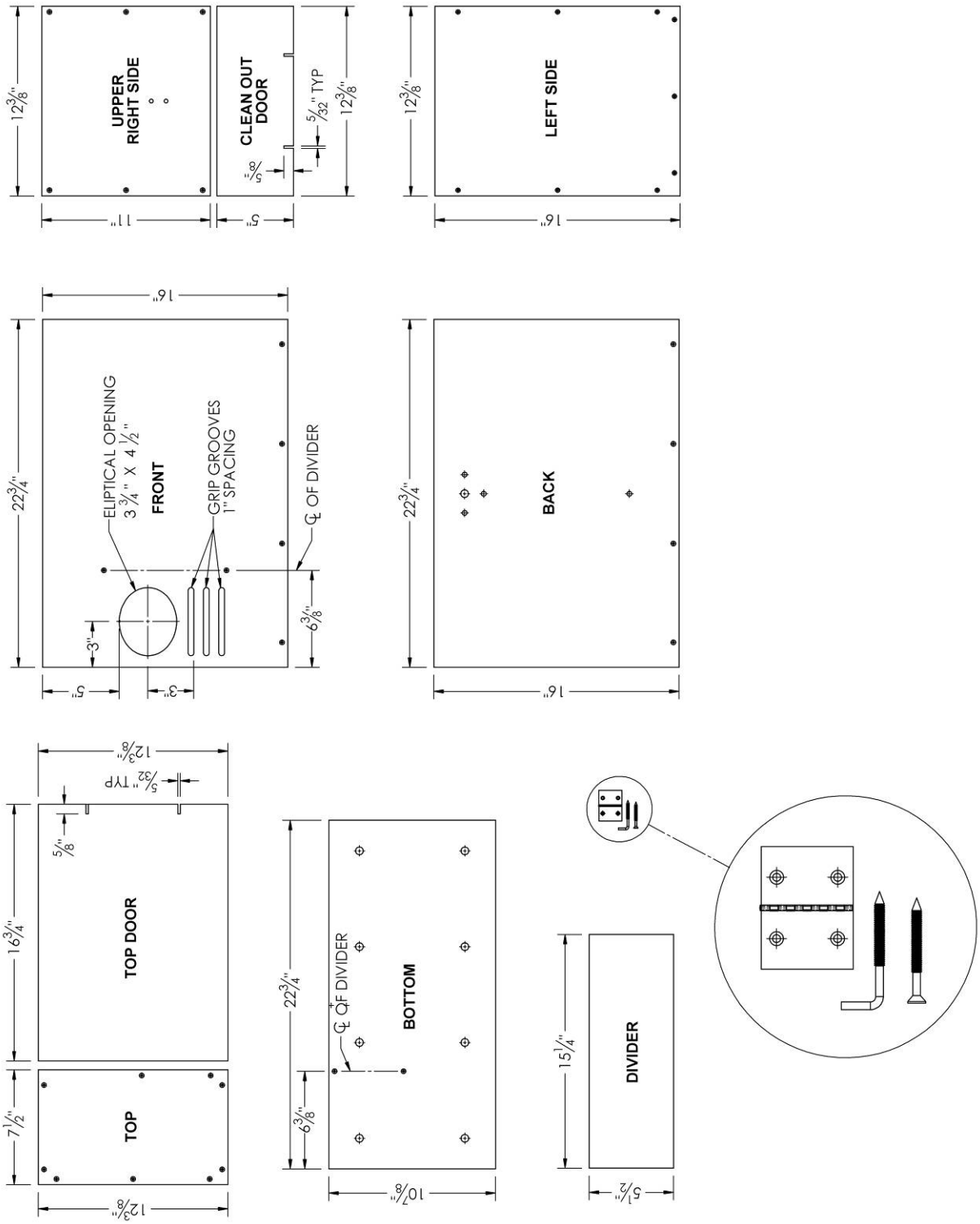
The following materials are required to assemble **two** boxes:

- 1 sheet ¾" x 4' x 8' exterior plywood or siding
- 68 each 1 5/8" #8 Deck Screws
- 8 each 1 ¾" long L-Screws (sometimes called right angle screws or square bend screw hooks)
- 4 pair 1.5" x 1.5" nickel plated, non-removable pin hinges with screws
- Exterior grade (waterproof) glue such as Titebond II or Titebond III. These are non-toxic, yellow woodworking glues which are water soluble before curing.
- 2 each ½" wide metal glue brushes (typically sold as flux brushes).



Details of Dimensional Drawings

Notes: The metal parts are scaled 4X the size of the wooden parts. The holes in middle of the back are illustrative.

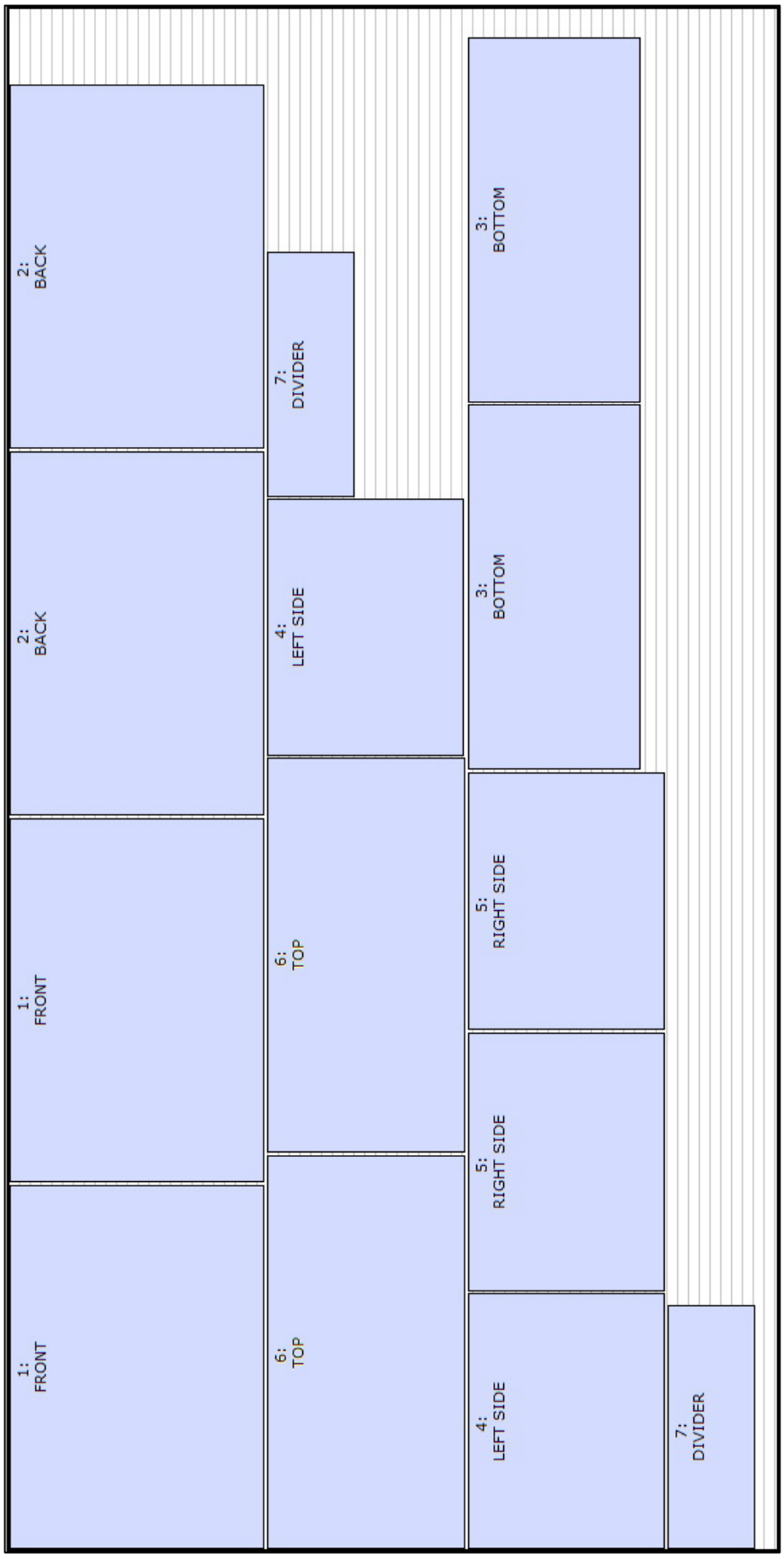


Cutlist

The cutlist on the next page shows a layout for cutting two boxes from a 4’ x 8’ sheet of plywood. In this drawing, the saw kerf is assumed to be 1/8”, and the material loss due to the kerf is accounted for. Note that the TOP and the RIGHT SIDE are cut sufficiently long that they can each be sawn into two separate parts—the TOP and TOP DOOR, and UPPER RIGHT SIDE and CLEAN OUT DOOR. Once cut, keep the parts paired to insure a snug fitting assembly with minimal water entry.

The below parts list provides additional details.

Part #	***Description***	***Copies***	***Width***	***Length***	***Note***
1	FRONT	2	16”	22 3/4”	
2	BACK	2	16”	22 3/4”	
3	BOTTOM	2	10 7/8”	22 3/4”	
4	LEFT SIDE	2	12 3/8”	16”	
5	RIGHT SIDE	2	12 3/8”	16 1/8”	Cut into 11" high UPPER RIGHT SIDE and 5" high CLEAN OUT DOOR
6	TOP	2	12 3/8”	24 3/8”	Cut into 7 1/2" long TOP and 16 3/4" long TOP DOOR
7	DIVIDER	2	5 1/2”	15 1/4"	



Cutlist for two Barn Owl boxes from a 23/32" thick, 4' x 8' panel. Each TOP and RIGHT SIDE are to be cut into two parts each, so the total length in this table includes the 1/8" saw kerf.

Drilling Parts before Assembly

The use of 'drawings' below refers to those in the section titled *Details of Dimensional Drawings*.

It is advantageous to drill many of the parts and cut the entrance hole before beginning assembly.

The Barn Owl box is put together with screws (# 8 deck screws) and exterior glue. It is helpful to drill 5/32" clearance holes for the screws 3/8" from the edge of the TOP, FRONT, SIDEs, and BACK at the spots indicated in the drawings.

Eight 1/2" drain holes are drilled in the bottom approximately as shown.

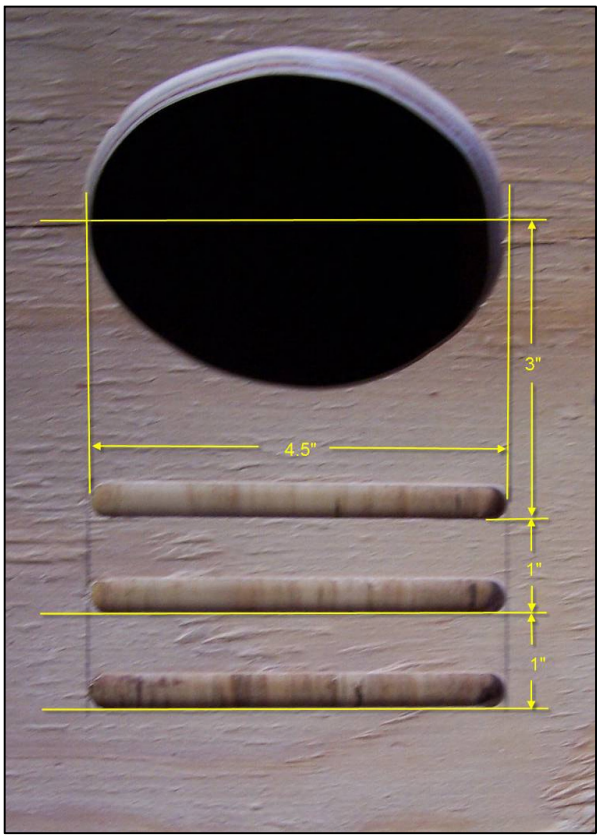
The entrance hole is an ellipse with axes 3 ¾" and 4 ½". A template in the next section can be used to trace the exact dimensions of the hole and guide the location of it on the FRONT. Cut it with either a scroll saw or a keyhole saw, then sand the edges smooth.

Barn Owl pair
Photo by Lee Pauser

Entrance Hole and Grip Groove Dimensions

The entrance hole was developed just large enough to allow the barn owls to fit through it while keeping the larger predators out. The horizontal axis of the ellipse is 4 ½" and the vertical axis is 3 ¾". (See previous section).

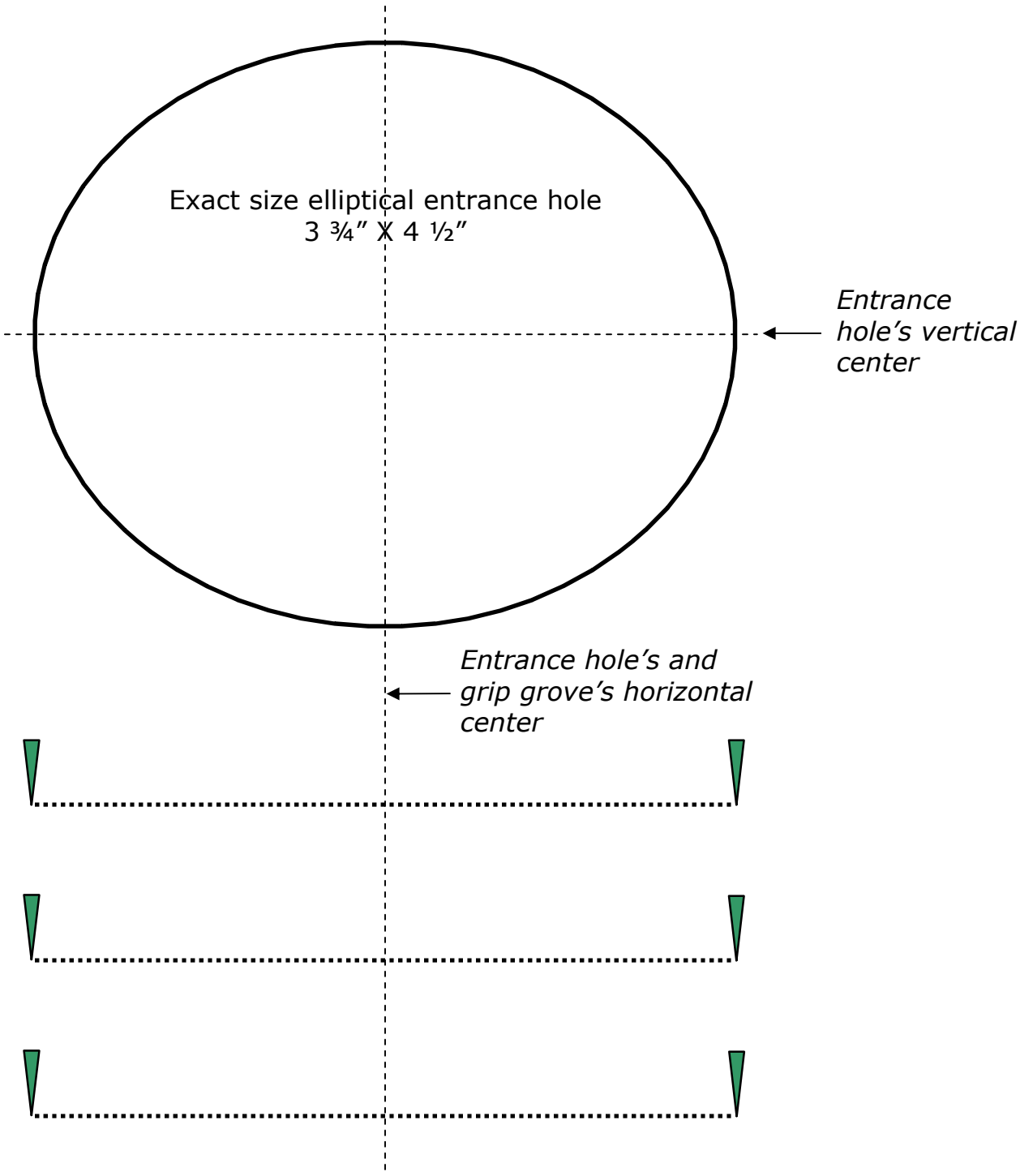
Three grip grooves below the entrance hole aid the owls when entering the box. They can be cut with a router using a 3/8" straight bit set to cut 1/8" deep. Alternatively, shallow grooves 1/8" deep can be cut with a sharp chisel. Whatever the method, the grooves should not reach completely through the wall.



The following page contains a template that can be used to easily position the entrance hole and grip groves on the box's FRONT.

To use the template:

1) If you haven't already done so, print the template, and ensure that it printed correctly (see the *Important Note*).
2) Cut out the template's entrance hole.
3) Lay the template on the box's FRONT positioning it so the hole's horizontal center line is 6 7/8" from the FRONT's top edge, and the hole's vertical center line is 3" from the FRONT's left edge. The template's left edge should align with the FRONT's left edge.
4) Use a sharp tool, punch, or pencil to mark the pointed end of each of the template's six arrows.
5) Using a sharp pencil, trace the hole's shape (cutout) on the FRONT.
6) Remove the template.
7) Cut the entrance hole into the FRONT.
8) Draw horizontal lines between each of the three grip grove's left and right marked points. These lines represent the length of and **bottom edge** of each of the 3/8" wide grip groves.
9) Cut the grip grooves.



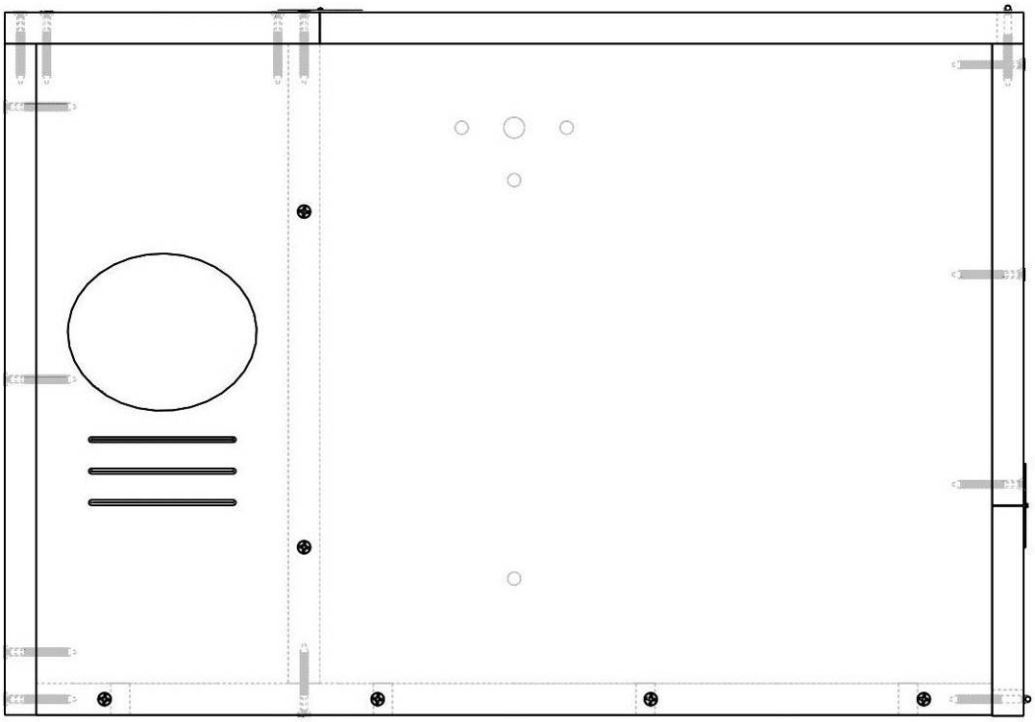
Important Note: Before using this template, you should ensure that it printed correctly. This can be done by verifying that the entrance hole's dimensions as printed are 4.5" in width and 3.75" in height. A possible reason for the dimensions being incorrect originates in your printer's page setup options. This page should be printed with the *Page Scaling* option set to *none* or the *Page Sizing* option set to *Actual Size*.

Assembling the Box

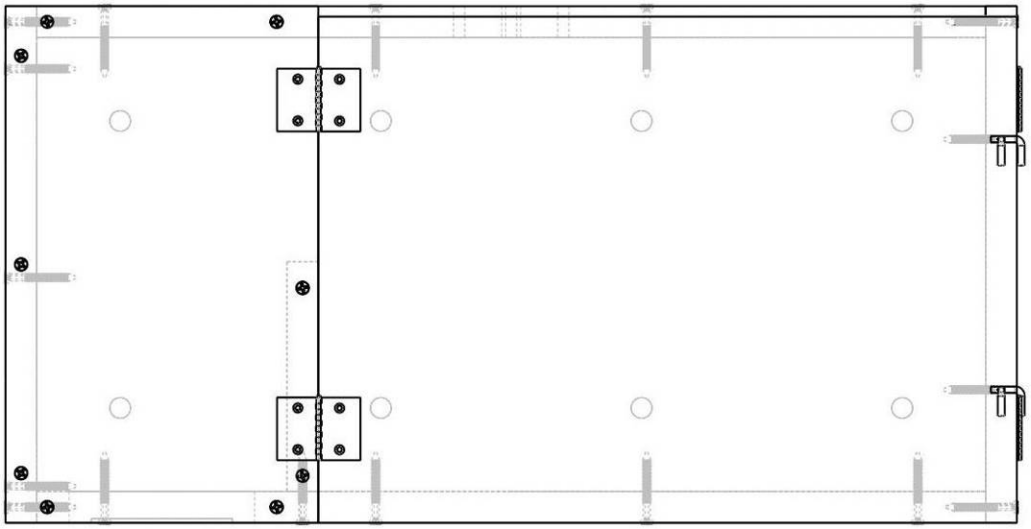
The box is assembled using deck screws (#8, 1 5/8" long) and exterior glue. Deck screws are preferred since they are more weather resistant than other screws. Any surface on this box held together with screws should also be glued. Using the small metal brush, coat both surfaces before assembly. To avoid splitting the plywood, it is helpful to drill pilot holes for the screws in the wood below the outer sheets. For this a 3/32" bit is used to make a hole 7/8" deep. If an air nailer is available, it can be used to tack the parts together initially. Then the pilot holes can be drilled through the clearance holes, and the screws can be driven into place. If no nailer is available, apply the glue then use just a few screws to hold the box together initially. At this point the pilot holes can be drilled through the remaining clearance holes, after which the screws can be driven into place. The steps to assemble a box are as follows.

1. Attach the BACK (2) to LEFT SIDE (4)
2. Attach BOTTOM (3)
3. Attach FRONT (1)
4. Attach DIVIDER (7)
5. Attach UPPER RIGHT SIDE (part of 2)
6. Attach TOP (part of 6)
7. Attach CLEAN OUT DOOR (part of 5) using hinges
8. Insert CLEAN OUT DOOR L-screws (use 3/32" pilot bit)
9. Attach TOP DOOR (part of 6) using hinges
10. Insert TOP DOOR L-screws (use 3/32" pilot bit)

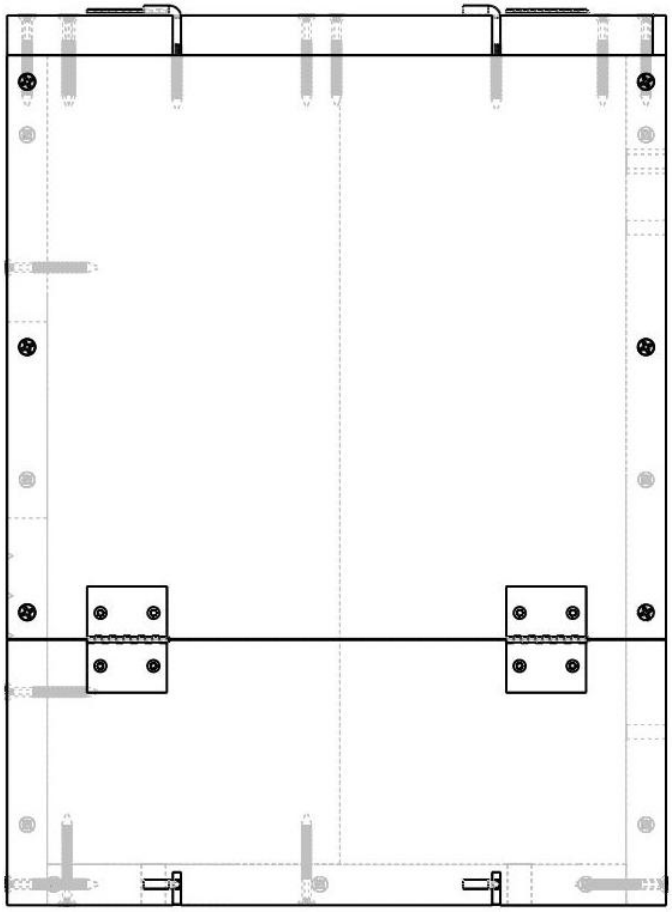
Tighten the L-screws until they are snug. These screws are widely used in nest box trails of smaller bird species such bluebirds. Use of L screws has the practical advantage compared to a traditional screw in that a trail monitor need merely twist the L screws about ¼ turn with a pair of pliers to release the door. An additional advantage of L screws over conventional screws is that L screws are never lost in the field since they are not removed from the box.



Assembled Front View



Assembled Top View. This one shows an offset, narrower top which might be needed if the box were mounted on a wall or tree. See the section titled ***Preparations to Accommodate Mounting Methods***.



Assembled right end
with clean out door.

Barn Owl hen with owlets a week-old and less
Photo by Lee Pauser

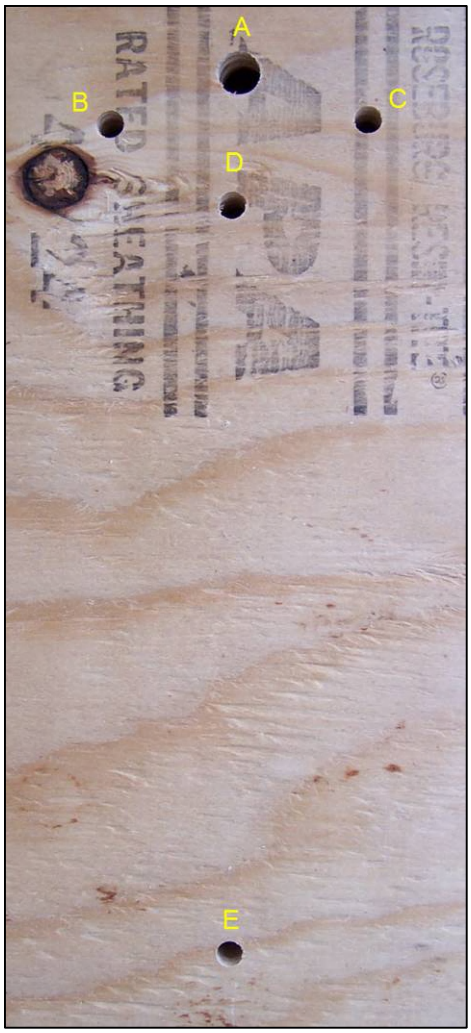
Preparations to Accommodate Mounting Methods

At this point the mounting method should be defined so that the relevant drillings can be done to enable the mounting. It is much easier to do this before the box is carried to the site. This section discusses common options.

In any case where threaded bolts are used, ***insert the bolts from the inside of the box and out through the back of the box***. This prevents injury to the box's occupants from having encountered a bolt protruding into the box. The bottom of the box should be level when mounted to prevent eggs from rolling to one corner of the box.

Three common mountings are flat surfaces (buildings or rectangular wooden poles), large trees, or metal poles. As discussed below, metal poles have advantages in reducing predation.

If the box is to be mounted on a surface which will extend *above* the top of the Barn Owl box, such as a building, a power pole, or a tree, you need to ensure that the operation of the top door is unimpeded by friction with the surface. This can be done either by trimming ¼" off the side of the Top Door (total width of that piece is then 12 1/8") and or by using spacers or backing boards to increase the box's distance from the mounting surface. The use of spacers may also be necessary to level the box.



The photo on the right details the array of mounting holes as shown in the drawings, but only a few of these holes will be used in any one mounting method. The hole A, a ½" diameter hole, is often useful. It can be used initially to hang the box on a large nail or screw set into the mounting surface. Once the box is hung in place on the nail or screw, it is easy to proceed with other mounting operations. The smaller holes are 5/16" diameter to accommodate 5/16" lag bolts or threaded bolts which should be used with a fender washer to attach the box.

Some examples of other hole combinations are: D and E are drilled where the mounting surface is flat; B, C and E can be used where the wooden mounting surface is rounded, such as on a tree trunk.

Metal poles offer an advantage in predator control. Although raccoons can climb metal poles[1], their access can be minimized by using a piece of stove pipe as a predator guard. Use a 24" length of stove pipe with a diameter of 8". Place the stove pipe around the mounting pole, attach it loosely with wires to the bottom of the box. The bottom of the stove pipe is unconnected, and this wobbly structure restricts the upward mobility of raccoons.

When mounting on metal pipe, pipe clamps (pipe grip ties) can be used. In this case, the holes in the back of the box should match those of the clamps as shown in the photo at the right. The photo shows the use of a backing board between the clamps and the box.

If this technique is used, it is best to secure the clamps to the box in the following order:

1. Drill two mounting holes on one side of the pipe, and attach both clamps using 5/16" threaded bolts (inserted from the inside box to the outside).
2. Insert the pipe, and tighten the bolts.
3. Drill two mounting holes on the other side of the pipe, and attach both clamps using 5/16" threaded bolts.

This technique eliminates the problem of being unable to sufficiently tighten the clamps on the pipe. In the picture, a single hole is drilled through the lower clamp into the pipe to accommodate a sheet metal screw. This screw further prevents turning or slipping of the box on the pipe.

Another variation of mounting a box on a metal pole is shown on the right. This method involves the welding of a piece of angle iron (1/8” x 2” x 2” x 12”) horizontally to the post at a spot where the box can rest. In this case, holes in the horizontal angle iron can be set to allow screws to be driven into the edge of the bottom or set to allow the use of 5/16” threaded bolts with a fender washer inside to hold the box. An iron plate (1/8” x 2” x 12”) near the top of the pole provides a spot where the top of the box can be stabilized with bolts. All of the mounting holes in the metal pieces should be drilled before the box is mounted.

To Paint or Not to Paint

The box will provide many years of use without painting. If the decision is made to paint the box, apply either a white exterior latex based paint or a linseed oil finish. White is the most heat reflective color which reduces the heat buildup within the box, but lighter earth tone colors are acceptable. DO NOT use dark colors which absorb more of the sun’s radiant heat, and contribute to the buildup of heat within the box.

3-4 week-old owlets
Photo by Lee Pauser

Apply the finish to the exterior of the box only.

Where to Place the Box

Numerous factors enter into answering the question "where should I place a Barn Owl box". The goal of installing a box should be to enable the owls to have a successful nesting experience, and the information provided herein is intended to help you in the decision. However, understand that there is no guarantee that even a box placed in an ideal location will be successful--Mother Nature and the owls themselves have the final word.

Locations Having Potential

Barn Owl habitat is generally open fields and meadows. Why is this? The owl's diet consists primarily of Pocket Gophers, Voles (or Meadow Mice), Deer Mice, and House Mice which live and reproduce in such habitat. This is where the Barn Owl's prey feeds on grasses, tubers, roots, sedges, forbs, etc.

Therefore, the best location for a Barn Owl box is near (not necessarily directly on top of) an area where the latter are readily available. Such areas include:

- Open grassland or on its edge.
- In cropland areas with trees. Here the rodents are often in the uncultivated area between the trees and cultivated crops and the number of owls that can be supported is determined by that area[2].
- Open woodland.
- In vineyards and orchards.

Locations Lacking Potential

One statistic states that the average life span of a Barn Owl is two years, and another statistic states that most Barn Owls survive for only one mating season. Although these are grim statistics, Simmons found a hen in the same nest box for seven out of ten years. This would indicate that the owls return to nest sites where they have previously had a successful nesting experience.

Insight into why Barn Owls have such a short life span also factors into the answering the question of where to place the box. What follows is a discussion of the leading causes of Barn Owl deaths.

The #1 killer of Barn Owls is starvation

There are various statistics for the volume of rodents that Barn Owls will consume. One interesting statistic is that a male Barn Owl will have to catch 25 mice a night to support himself (3 mice), his mate (2 mice), and five owlets (4 mice each). Obviously, the size of the mice and the age of the owlets enter into the equation, but it is interesting because it highlights the fact that the male has to be an expert hunter until his mate participates in the feeding task, and that the food source has to be continually available. If it is not, a hen will abandon her eggs and owlets, and owlets and even adults will die.

Barn Owls hunt over a range that may have a radius of as much as a mile or more, and the hunting ranges of individual owls may overlap[2]. If the location for a planned box is in or next to ideal habitat, a food source should be available. If the box is to be placed in less than ideal habitat, the required food source may or may not be available. One then needs to consider where and how far away the owl's food source is, and if hazards exist between the two.

Barn Owls have been known to roost in, and even nest in palm trees in a suburban environment, but breeding may not be successful. A suburban environment for a nest box is too often less than ideal because of human activities. Noise such as alarms, fireworks, horns, power equipment, barking dogs, etc. can startle a hen on eggs, and cause nest abandonment.

Inclement weather can have a negative effect on the Barn Owl's hunting success, and, therefore, its ability to feed itself and others. Barn Owls flight is soundless, and they hunt primarily by sound. Imagine an owl trying to locate prey while flying through driving rain. When a Barn Owl feathers become wet, the owl may loose its soundless flight. The wind and rain may drown out the sounds made by its prey, and the prey itself may make less sound as it moves about and eats. Protracted inclement weather can lead to starvation.

The #2 killer of Barn Owls is trucks and trains

When hunting, Barn Owl's fly at a height that will normally take them over cars, but not over trucks and trains. The owls hunt primarily by sound, so while hunting, they face downward and they are intent on the task of finding prey. Thus they may never notice an approaching truck or train.

A consideration in planning the location of a nest box is whether roadways and railways are near the location. If so, what is the nighttime volume of traffic? A location next to a busy freeway or railway should be ruled out.

The #3 killer of Barn Owls is natural predators

Natural predators of Barn Owls include Great-horned Owls and Red-tailed Hawks which nest in groves of large trees. A consideration in planning the location a nest box is whether such groves are nearby, and whether they host such predators.

Since both the Barn Owl and Great-horned Owls are nocturnal, the likelihood of an encounter is greater than that of a Barn Owl encountering a Red-tailed Hawk. Barn Owls may find it necessary to take flight during the day, and this may lead to an encounter, or they may be discovered by a predator while roosting in a tree, barn, etc. during the day.

A poorly designed nest box having a porch or roost can lead to predation of Barn Owl owlets as these perches will allow the Great-horned Owls and Red-tailed Hawks a landing area from which to predate the owlets. Additionally, the Barn Owl owlets at around 4 weeks of age begin peeking out of the nest box, and, if porches and perches are provided, they will use them and be exposed to predation. Simmons' design omits such landing areas.

Another natural predator of Barn Owls is Raccoons. A poorly designed nest box will have an entrance hole that permits Raccoons to enter the box, and predate the owls. Simmons' design employs an entrance hole the size of which prevents a Raccoon from entirely entering the nest box, and includes a partition to provide occupants shelter from predators.

Additional killers of Barn Owls

Poisons are sometimes used to control the rodent population, and some poisons can cause a secondary poisoning effect—a poisoned rodent is

consumed by a bird of prey which is in turn poisoned. Insure that no such poisons are used within the hunting radius from the planned location.

Other Location Factors

The male Barn Owl is territorial, so the boxes should be placed a minimum of 80 yards apart.

Barn Owls never hunt near their nest box, and they never reduce the rodent population to zero.

Admittedly, it is difficult to predict with certainty whether a box will attract owls; the best locations are sometimes determined by trial and error.

Owlets around 6-7 weeks-of-age
Photo by Lee Pauser

Mounting Considerations

A significant finding by Simmons is that he has success with mounting the boxes such that the top of the box is as low as 8’ above the ground.[1] this finding is in marked contrast with many reports in the literature where heights of 12’ to 20’ are often proposed. Simmons mounts most of his Barn Owl boxes on a 2” diameter steel pipe about 10’ long[1,3]. The pole is set in concrete with about 8’ extending above the ground. Mounting at this height affords rather simple access to the box using an 8’ orchard ladder. If the box needs to be mounted our of harms way (perhaps to prevent disturbance of the box in public areas), then it can be mounted 11’ or 12’ high.

As noted earlier, mounting the box on a barn or other building is a possibility, but there is evidence[2] that given a choice owls prefer the sites with the least human activity.

Barn Owls will nest in boxes mounted on a tree, but a clear approach path to the box is needed.

Whatever method is used, remember that access to the box is needed to monitor it often and to clean it out once a year.

Before mounting, remember to add a layer about ¾" of wood shavings to the bottom of the box. Owls bring in no nest material, so the shavings prevent the eggs from rolling around. Also remember that the box should be level when mounted.

Breeding Cycle and Life Style

Simmons' findings[1] are that owls rarely begin the breeding cycle before January. The last fledging normally occurs in May or early June, but exceptions do occur. The owls may continue to use the box for a few weeks, and sometimes it's used even longer for roosting. At the beginning of the cycle, males attract females to the nest box by bringing in large numbers of prey proving he is a good provider. Early in the season such findings are evidence of possible future use of a box. During breeding the female produces an egg every 2 or 3 days until her clutch is complete (on average 6 eggs). She begins incubation after having laid the first egg, and the eggs hatch in about 30 days. Thus for several weeks the box may have a distribution of big and small owlets co-existing with eggs. The female stays in the box until the youngest owlet is 12 days old and covered in down. Then the female joins the male in hunting prey. From the time the female begins incubation, and until the female leaves the box, it is the male's job to deliver a steady flow of food to the female and owlets. The owlets fledge around 8-9 weeks after hatching. By the end of the nearly 3 month cycle, the total weight of prey delivered to an average clutch of Barn Owls is 60 to 70 pounds.[1,2,4]

O'Brien's book[4] recounts her personal story of serving as both parents to a Barn Owl during this period as well as her personal interaction with that owl for another 19 years. It is a touching book which details the remarkable skills of her Barn Owl, the time demanded by the owl, and the heavy load of providing several dead mice per day without letup (28000 mice over the life of the owl in her case!).

Maintenance

A barn owl family will create three inches or more of debris in the box in one season. The box should be cleaned out using a trowel or other cleaning tool once a year during August or September. **Warning: Cleaning the box can cause exposure to Hantavirus (Hantavirus Pulmonary Syndrome).** For protection, rubber gloves and a good dust mask rated N95 or higher should be used during the process, and every effort should be made avoid exposure to the dust.

During the cleaning, the box should be inspected for damage, and appropriate repairs done. A few drops of oil applied to the hinges will prolong their serviceable life.

After cleaning, add a layer of fresh wood shavings about ¾" deep to the box.

If an owl is in the box when it is opened, close the box, and try another day.

The final product—an 8-9 week-old owlet
Photo by Lee Pauser

IBM Almaden Research Center

The IBM Almaden Research Center was created in 1986 on a 690 acre tract in San Jose, CA in the foothills above Silicon Valley. The center has been a certified wildlife habitat since 1991 under the auspices of Wildlife Habitat Council (WHC). The WHC is a nonprofit, non-lobbying 501(c)(3) group of corporations, conservation organizations, and individuals dedicated to restoring and enhancing wildlife habitat. Created in 1988, the WHC helps large landowners, particularly corporations, manage their unused lands in an ecologically sensitive manner for the benefit of wildlife. Certification validates wildlife habitat projects to employees as well as to the community at large, transferring sustainability into people's everyday lives. Anais Nguyen at the IBM Almaden Research Center coordinated the successful effort toward certification, and she continues to coordinate the activities relevant to continued certification. Contemporary scientific and academic thought attributes increased significance to the role of privately owned lands in establishing and maintaining habitats to conserve species diversity in places where people live, work or play.

Acknowledgements

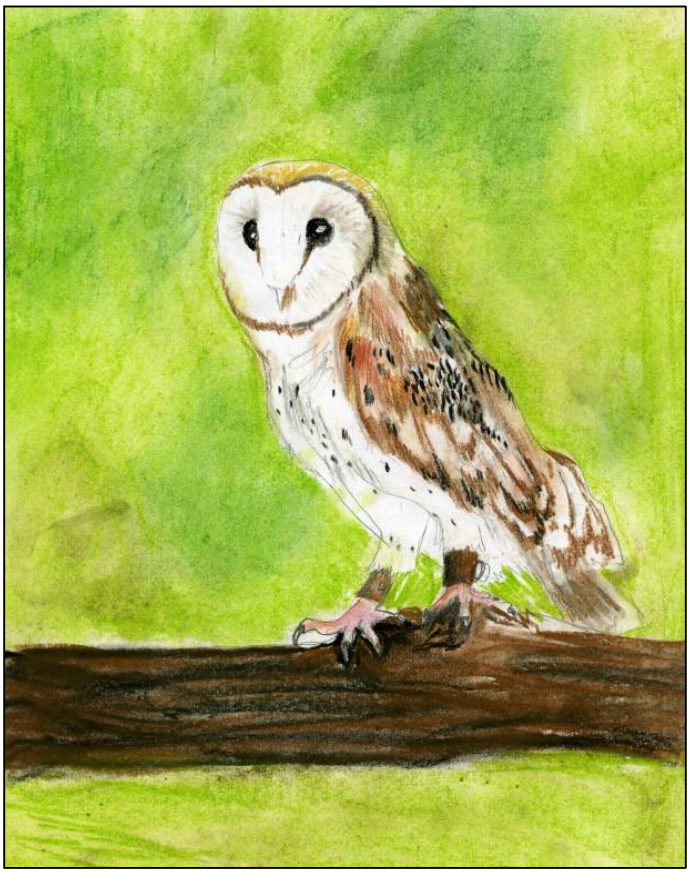
The authors acknowledge IBM and the IBM On Demand Community which support this environmental work as well as many other outreach activities at the IBM Almaden Research Center.

Scott Stokes contributed the ideas for the entrance hole template.

The photographic skills of Charlie Rettner from the IBM Almaden Research Center are acknowledged.

Anais Nguyen's guidance and support of the nest box projects in her role as environmental engineer at the IBM Almaden Research Center has been terrific.

Finally, Natalia Daraselia's artistic skills are appreciated.



Natalia Daraselia, age 12

Steve Simmons, Charles Wade, Lee Pauser and Anais Nguyen. *Photo by Charles Rettner.*

David Altknecht. *Photo by Charles Wade*

References

1 Steve Simmons, private communication.

[2] Barn Owls: Predator-Prey Relationships and Conservation. Iain Taylor, Cambridge University Press, 2004. 324 pages. This is an excellent, scholarly text with many observations of owls in the wild.

[3] This company sells Barn Owl boxes and mounting poles: Smudge and Company c/o Larry Fister, (209) 723-5837. fisterl@yahoo.com.

[4] Wesley the Owl, the remarkable love story of an owl and his girl, Stacey O'Brien, Free Press, 1230 Avenue of the Americas, New York, NY 10020, 2008. This is a very informative and touching story of O'Brien's adoption of a baby Barn Owl with an injured wing and of her life with Wesley, as she named the owl, for nearly 19 years. The book includes descriptions of the incredible physical skills and intelligence of Wesley and of the bond Wesley forms with O'Brien as she labors to serves as a mother figure. Interweaved are scientific details on owls from an owl study laboratory at the California Institute of Technology where O'Brien worked and on wild Barn Owls which she also studied. She describes many of the audible calls from the remarkable array of sounds which Barn Owls emit. It's rare to find such a detailed view of Barn Owls.

Internet Resources

http://www.scvas.org

Web address for the Santa Clara Valley Audubon Society (SCVAS) in Cupertino, CA. It is a primary source of information for the California Bay Area.

http://www.audubon.org/

Online site of the National Audubon Society. An enormous range of information is available and links are given to other sites.

http://www.almaden.ibm.com/almaden/welcome.html

Home page of the IBM Almaden Research Center in San Jose, CA. The center sits on 690 acres in the foothills above Silicon Valley.

Addendum to Build a Barn Owl Box

Modeled after an Original Design by Steve Simmons

Natalia Daraselia, age 14, free-hand drawing from a published image.

Lee Pauser

October 22, 2022

Foreword

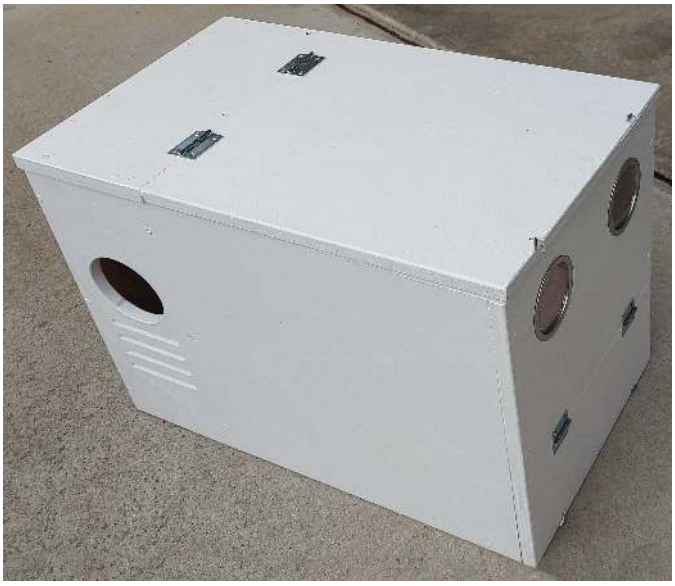
This document is an addendum to the document titled *Build a Barn Owl Box which is modeled after an Original Design by Steve Simmons* and dated February 27, 2012.

In this addendum I provide details on several modification and additions to the original nest box that in my experience with Barn Owls can increase the owl's nesting success.

Contents

Build a Larger Nest Box by Reducing Material Waste

The below usurps the section titled **Cutlist** on pages 11 and 12 in the original document.

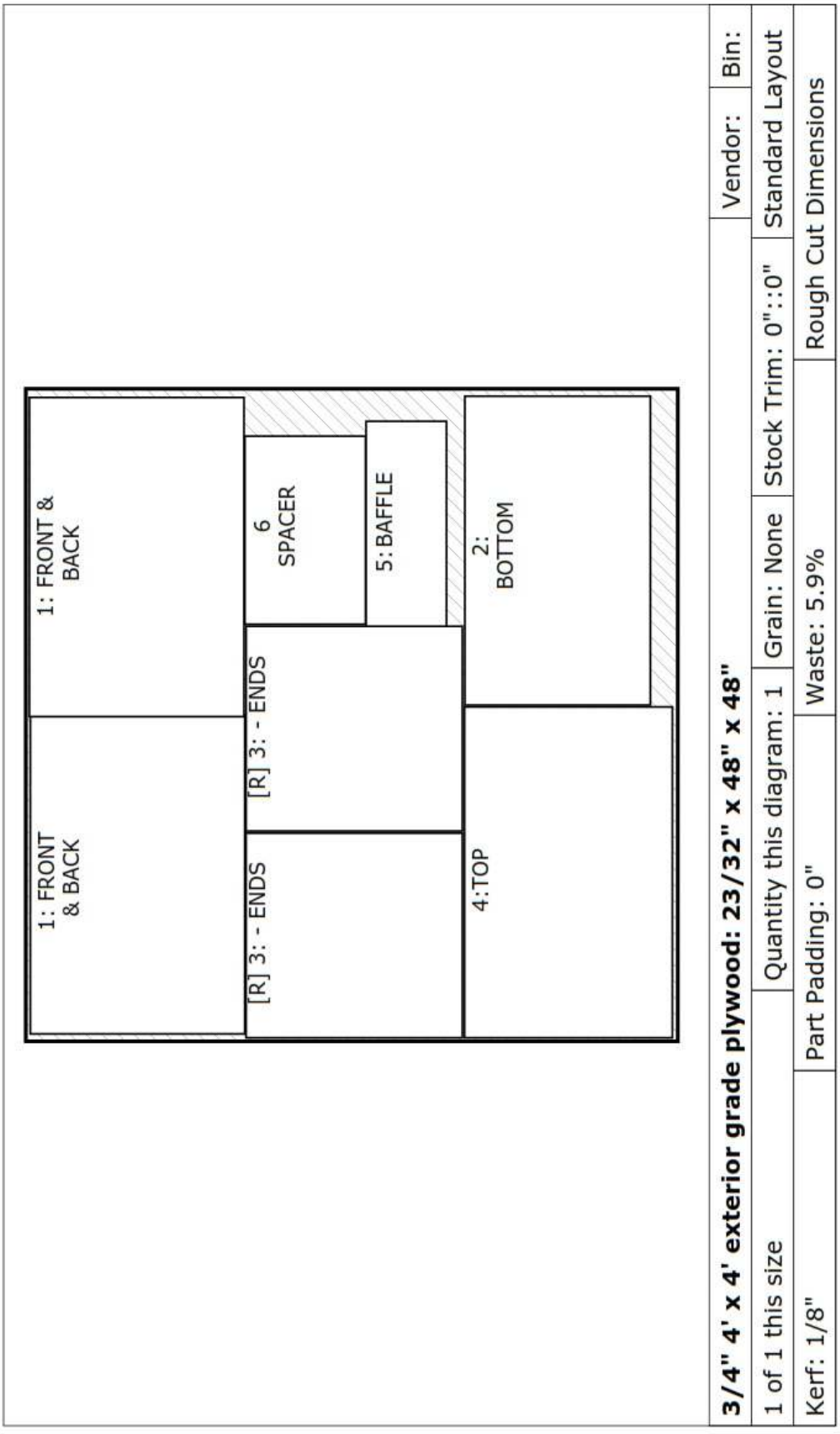


The cutlist on the next page shows a layout for cutting the parts for one box from a 4’ x 4’ sheet of plywood. A larger box results having reduced material waste to a minimum.

Note that the TOP and the RIGHT END are cut sufficiently long that they can each be sawn into two separate parts—the TOP and TOP DOOR, and UPPER RIGHT SIDE and CLEAN OUT DOOR. Once cut, keep the parts paired to insure a snug fitting assembly with minimal water entry.

The below parts list provides additional details.

Part #	***Description***	***Copies***	***Width***	***Length***	***Note***
1	FRONT & BACK	2	16”	23-3/4”	
2	BOTTOM	1	13-13/16”	23”	
3	ENDS	2	16-1/8”	15-1/4”	Use good part for right end and cut at 9 degrees to 10" upper and 6" lower. Use poorer part for left end and trim to 16” x 13-13/16”
4	TOP	1	15-1/2”	24 5/8”	Cut into 7-11/16" left and 16-13/16" right parts.
5	DIVIDER	1	6”	15 1/4"	
6	SPACER	1	9”	14”	



Limiting the Internal Temperature of an Exposed Nest Box

Both Steve Simmons and I have experienced some owlets jumping from nest boxes when we have a period of 90+ degrees hot weather lasting for several days. The owlets must simply get too hot in the boxes. Below are several additions that may help to limit the box's internal temperature to near the ambient temperature.

Paint the Box White

This is mentioned in the original plan, but experience and noting the effects of climate change make this action more imperative.

A recent study titled Reducing the Internal Temperature of Exposed Nest Boxes compares the internal temperatures inside three different bluebird nest boxes. In looking at the study's results one can quickly see the benefit of a nest box that has been painted white. If white is an objectionable color, use a light earth-tone color.

Add Sunshield(s)

As stated above painting nest boxes white was most effective, but this may not be practical for several reasons including white as being an objectionable color. The effectiveness of other earth-tone colors hasn't been determined.

Enter installing a sun shield. The shield is basically a second and larger roof attached to the top of the box that provides shade. Spacers can be installed between the two roofs to provide an air gap which allows air to flow between the roofs, or a layer of foam insulation can be sandwiched between the two roofs.

In Figure 1 below I had used a piece of 3/8" exterior grade plywood for the shield, and painted it on both sides to minimize warping. The spacers are ¾" exterior plywood first positioned, and then glued to the shield. Mounting is done by drilling holes through the shield and spacers for deck screws. The screws are long enough to pass through the shield and spacers, and penetrate the box's top without entering the interior of the box. You may decide to use more than 4 spacers, but 4 seems adequate. Yes, if your box has a top door, you must remove the shield to open the door.

Figure 1: Bottom of Sun Shield with attached spacers

Figure 2: Installed Sun Shield

A sun shield added to the west-facing side of a box helps limit the internal temperature during hot afternoons.

Flow-through Ventilation

Adding air vents above the clean out door for flow-thru ventilation can help to keep the interior cooler. Obviously the vents work best if there is a breeze. That same breeze could be a cold breeze in the early months or a hot breeze later in the year.

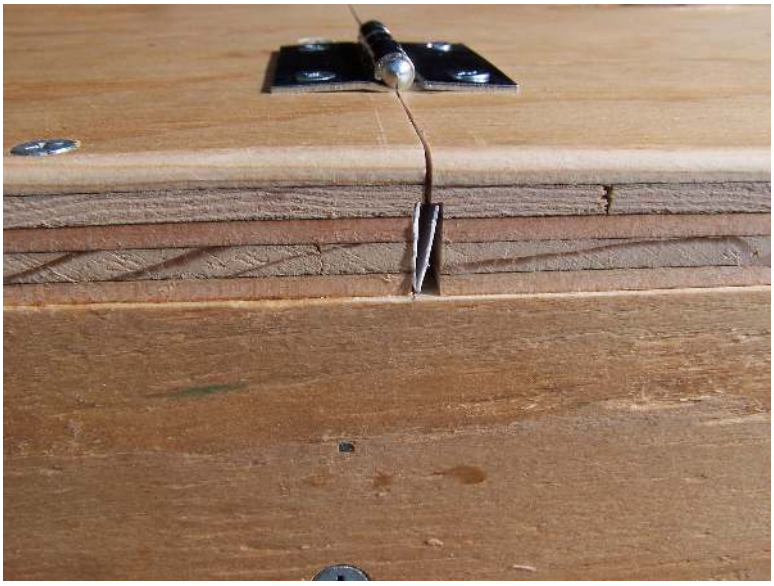
Pictured to the right is an image of the vents I use.

Figure 3: Air Vent Mini Louver 3"

Two 3” holes are cut in the right end with a hole saw using the pictured dimensions. The vents are then seated in the holes such that the louvers slope downward on the exterior side. Place a flat board over the vent and tap the board lightly with a hammer to evenly seat the vent.

Weatherproofing the Box's Top Door

You can better seal the top door's hinged joint to keep water from entering the gap by adding some weather seal. Basically a 1/8" wide and 1/2" high notch is cut into the lower portion of the 2 top pieces, and a V shaped piece of weather stripping is affixed to the foyer's top piece. The weather stripping acts as a gutter to route water to the outsides of the box.



The weather stripping used is V-Flex Weather Strip which can seal gaps up to 3/8". One side of the stripping has an adhesive to hold it in place.

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Additionally you can add weather stripping around the edges of the top door as shown in the attached photos. In my experience top doors sometimes warp depending upon the quality of the plywood. The warping creates a gap that permits rain to enter the box especially when it is wind driven. Should this happen the bedding and owlets could get wet causing the owlets to die of hypothermia.

Basically 1/8" of the bottom edge of the top is trimmed off on the 3 non-hinged edges to a depth of 1/2" to accommodate the weather stripping.

The weather stripping used is a self-adhesive rubber foam seal*. One side of the stripping has an adhesive to hold it in place.

* Door Seal Weather Strip, Window Anti-Collision Self Adhesive Rubber Foam Seal Strip Soundproofing Weather Stripping Waterproof Seal, 7/20-Inch x 6/25-Inch x 9.8 Feet, White(2 Seals)

