

## Structures for Wildlife – *Barn Owl Nest Box (649B)*

Overview and Specifications

January 2023

### OVERVIEW

**Will installing nest boxes attract barn owls?** For hundreds of years, barn owls (*Tyto alba*) had been nesting in close proximity to farmers and agricultural fields so frequently that they were given the common name for barns were they most often nested. Today many headquarters structures, including barns, do not accommodate barn owl nesting like those of the past. Because of their adaptability to nest on or near farms, barn owls in California transitioned to occupying the larger nest structures across the agricultural landscape that were designed for wood ducks. Installing artificial nest structures to attract barn owls has become an acceptable wildlife-friendly practice on many farms, ranches and wildlands in California.

Most often there is an expectation the barn owls will be some type of biological control for gophers and other rodents. Properly designed, installed and maintained nest boxes will attract barn owls in many agricultural settings. Despite the fact that barn owls are not territorial while hunting prey there is no evidence that they will control or eradicate the rodents on the location the boxes are installed. The findings of one study were that pocket gophers were the most important prey for barn owls, based on mass and frequency of occurrence in their diet. Barn owls switched from eating voles and mice during the winter to eating mostly gophers, especially juveniles, during the spring and summer. Barn owls may play a role in an integrated approach to gopher management by slowing population recovery following treatments with rodenticides, thereby reducing the frequency of rodenticide use.

**What is the ideal barn owl structure** A variety of barn owl nest structure designs have been used as part of barn owl conservation, but few provide the necessary protection from predators, enough room for large broods, and simple access side door to allow for easy monitoring and maintenance. This recommended nest box is an excellent design that has addressed all of these factors. The entrance hole dimensions are 5 inches in diameter. Additional features include grooves below the entrance hole that assist adults in entering the nest structure.



#### **MATERIALS FOR ONE BOX:**

*1 sheet of ½" untreated plywood (48 × 96")*

*Wood glue*

*2 hinges and 1 latch (galvanized) for cleaning hatch*

*24" length of ½" diameter PVC*

*8 ½" x 4" long hex bolts (blunt ended)*

*50 - 1 ¼" wood screws*

*Painting supplies*

## BARN OWL NEST BOX - SPECIFICATIONS

Section	Height" x Width"	Instructions
Top	24 x 18	Sits on top of front, back, and side pieces. Pre-drill 4 holes for heat shield attachment - 2" from each side of corners. Center the heat shield over top.
Front	24 x 24	The cut ends of side pieces are attached to the interior of the front piece. Entrance hole: 5" diameter centered (6" from the left and top). Grooves: 0.5", 3-4 grooved spaced 2" center to center (see picture). Add some grooves to the inside of the box under the opening hole, similar to those on the front, but they can be smaller.
Back	24 x 24	The cut ends of side pieces are attached to the interior of the back piece. Pre-drill four holes for heat shield attachments on back panel prior to assembly, and about 2" from each side of the corners. Center the heat shield, where wider side should be horizontally.
Bottom	23 x 17	Attached flush with interior of all pieces. Make 8 Drainage holes about ½" in diameter which are evenly spaced to facilitate water drainage.
Left Side	24 x 17	Side pieces are attached to the interior of the back and front pieces. Drill 1" ventilation holes that are centered 1½" from the top.
Right Side + top Cleaning Hatch	24 x 17	Side pieces are attached to the interior of the back and front pieces. Access door: Cut 9" from bottom for access door. Use 2 galvanized hinges and latch. Ensure that screws for the hardware are short enough so they do not go completely through the door. Drill 3-4 ventilation that are 1" in diameter and centered 1 ½" from the top.
Partition	23 ½ x 6	Cut ½" off height of remaining portion. Attach ½" right of hole. ½" off height of remaining portion. Attach ½" right of hole.
Rear Heat Shield	24 31	*Cut this piece last, as this piece may be slightly smaller. Attach a 4" bolt and ½" PV C spaces cut 2 ¾" long. Center the heat shield where the wider side should be oriented horizontally.
Top Heat Shield	24 x 30	* Cut this piece last, as this piece may be slightly smaller. Attach a 4" bolt and ½" PV C spaces cut 2 ¾" long. Center the heat shield over top

### Planning Requirements:

#### Assembly

- Assembly Order: 1) front, left side and back 2) bottom 3) partition 4) top piece of right side 5) top 6) add bottom piece of right side and heat shields after painting.
- Use ½ inch untreated plywood (48 x 96 inches).
- Glue and tack all pieces together according to instructions in the table.
- Carefully pre-drill evenly spaced holes and secure with 1 ¼ inch wood screws.
- Use furring strips to increase rigidity on heat shields and inside of box. (The unused portions of wood can be cut into strips for this purpose.)
- Attach cleaning hatch with galvanized hinges and a secure latch.
- Paint only the outside of the box with primer and light colored exterior paint, ideally use low VOC (Volatile Organic Compound) paint, if possible.
- After hanging nest box fill with 2 inches with untreated wood chips. Aspen chips are a good choice, if available.

- Use heat shields and add additional ventilation holes in areas where summer temperatures regularly increase above 85-90 degrees F.

### Placement

- Spacing and density of boxes depends on the foraging habitat with higher densities advised near grassland areas and fewer in orchard and vineyards. Start with one box per 5 acres and increase numbers in subsequent years if most boxes are occupied.
- Nest boxes placed with open natural habitat nearby, such as grasslands or oak savannah, have a higher chance of occupancy.
- Nest boxes are typically placed at the edges of fields or near the headquarters buildings. Barn owls typically hunt for prey consisting mostly of rodents preferring moist grasslands. In farmlands settings owls select for areas with higher prey density located along vegetated fence lines, hedgerows, waterway, road edges and woodland edges but are also thought to hunt orchards, vineyards and recently disked fields.
- Nest boxes should be visited beginning in late summer through fall to determine if cleaning is necessary. Do not disturb nest boxes if owls are present. Accumulated pellet debris should be removed and replaced with wood shavings. Wear an N95 mask during this process for protection.
- Make sure to place boxes where installation, monitoring and maintenance activities can be accomplished with little risk to those doing these activities.
- When installing nest boxes with a pole anchor pole in the ground at a depth of at least **3 to 6 ft**, depending on the use of concrete to support the pole and the soil type placed in. Concrete extending down 6' may be needed where soils are not well compacted after installation, or pressure to pole during maintenance may shift the stability of the pole. Where concrete is not used, the minimum depth of buried pole shall be 4 feet and soil type capable of sufficient compaction to keep pole erect.
- Although nest boxes can be mounted to the side of barns or other buildings consider the level of disturbance in the vicinity of where the box is intended to be mounted.
- Nest boxes need not be near preferred foraging areas. Studies have shown seasonal differences in barn owl foraging range with owls foraging up to several mile away in winter but foraging within 0.5 mile of nest site during spring and summer.
- Avoid installing raptor perches within 200' of paved roads, and ¼ mile from a multi-lane highway or freeway, unless exempted by a NRCS biologist. Placing nest boxes near roads, where young owls learning to fly, or hunt may get killed by vehicles. Collisions are thought to be a leading cause of barn owl deaths.
- Place the nest box at desired location no later than early December. Nesting owls begin to scout for nest sites at that time. In most low elevation areas of California, the nesting season typically begins in early February, peaking in April and completed by late May.
- Face entrance side of nest box away from prevailing winds and away from the west. Owls occupy nests boxes in the shade or those experiencing lower temperatures.
- Hungry nestlings may be noisy at night, so consider noise when placing near a house.

### Mounting

- Mount boxes on galvanized metal poles to keep mammalian predators from climbing a wooden pole or tree to access the box – especially if the box includes a porch.
- Boxes can be attached to the pole from either the bottom or back using a metal plate or the back of the box (not heat shield) using sturdy pipe grip ties.
- For most farms or ranches nest boxes do not need to be mounted any higher than 8'. This will allow for easy access during monitoring and maintenance activities. Exceptions are those locations with more frequent disturbance
- Most nest boxes are mounted on poles. Mounting on 2" diameter steel pipe that is about 10' in length and set in concrete buried about 2' should allow easy access during monitoring and maintenance activities.

- Mounting on metal pipes will reduce predation of eggs or young by snakes, raccoons, and squirrels.
- Mounting to the steel pipe can be accomplished by welding a piece of angle iron horizontally to the post at a spot where the nest box can rest. The other method is to use pipe clamps (pipe grip ties).
- Mounting on sides of building or trees can be accomplished using 5/16" lag bolts or threaded bolts.



*Mounting by welding piece of angle iron*

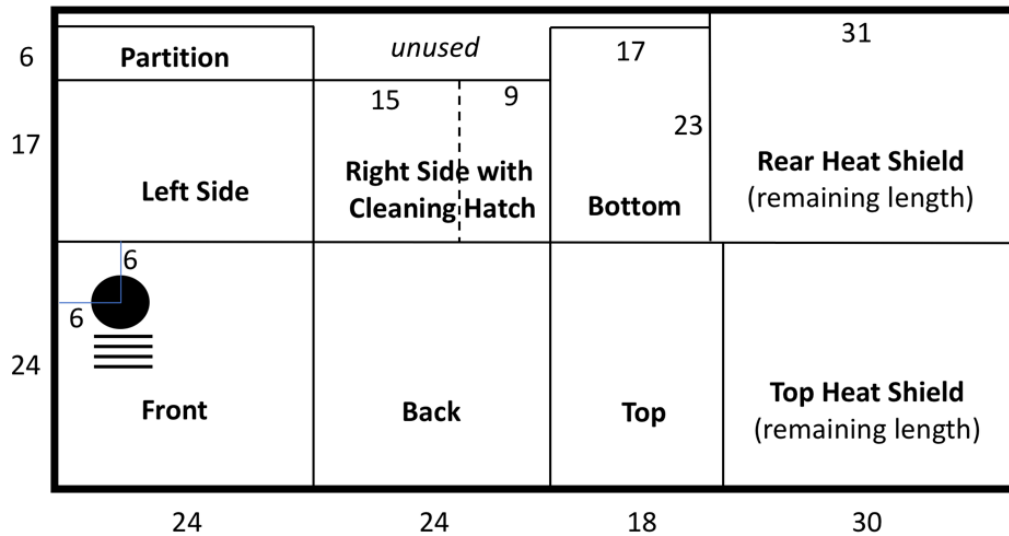


*Mount back of nest box with Pipe clamps*

### Monitoring and Maintenance

- **Monitoring nest boxes should occur at least once a year.** If there is only an opportunity to conduct checks once, that check should be the Pre-season check.
- Nest boxes need to be checked annually for structural integrity and deterioration– poorly maintained boxes can pose hazards to owls!
- During fall or winter cleanout of regurgitated pellets, be careful to remove all contents and discard away from nest structure. Barn owls regurgitate undigested prey items like bones and fur roughly twice a day. Regurgitated pellets can quickly fill up a nest box.
- Clean up any pellets that fall to the ground before or during nest box maintenance activities.
- During pre-season maintenance inspections consider lubricating hinges, check mounting structures and recharge cleaned out nest box with fresh wood shavings.
- To avoid disturbing a newly nesting barn owl, nest structures should be cleaned out and available for use by late December or early January. If maintenance activities are needed in January through March, check nest box in the late afternoon. **Caution: Barn owls will abandon nests more readily than most other secondary cavity nesting birds.** When disturbed early in the day, the owls will immediately seek shelter in trees which are leafed out. This leaves the eggs to cool off since incubation will cease in the hen's absence. Owls are thought to return when darkness occurs because of pressure from crows, ravens or raptors after exiting the nest box.

**Plans for Barn Owl Nest Box with Heat Shields  
Using an Untreated Plywood Sheet**



Cutting Order

Cut the plywood sheet starting in the bottom left to take into account the width of the saw blade in the measurements (typically 1/8th inch). The heat shields do not need to be exact, so cut these last.

References

Martinico, Breanna, Matthew Johnson, Ryan Barbour, Emily Phillips and Joseph Neill. Barn Owl Nest Box Plans, June 2022. Wild Farm Alliance