

Maine Northern Saw-whet Owl Nest Box Monitoring Program

March 2019, version 1.0



A Project of
Maine Natural History Observatory

Introduction

Thank you for your interest in Maine's Northern Saw-whet Nest Box Monitoring Program. This is a project coordinated by Maine Natural History Observatory in partnership with the Maine Bird Atlas, a project of the Maine Department of Inland Fisheries and Wildlife. Your efforts to place nest boxes in appropriate breeding habitat and monitor their use over multiple years will help us to understand the breeding distribution of saw-whet owls in the state, help us to understand their nesting phenology, and increase the number of suitable nesting options for this secretive species.

Nest boxes should only be installed if you or another volunteer intend to monitor and maintain the box throughout the season. An unattended box can be detrimental to owls and other native nest box users if non-native species begin using the box. Paper wasps, mice, squirrels, and even snakes may take up residence in an unattended nest box. For more information on how to handle these situations, see the "*Maintaining Nest Boxes*" section below.

Why Monitor Northern Saw-whet Owls?

Hole nesting species have been able to find and use natural cavities in trees and other crevices naturally found in the wild, so why does Maine need nest boxes for these species? Birds have been getting help from humans for some time – think about all of the bird feeders that are put out in Maine each year. In addition, some bird species are losing nesting habitat. Natural nesting cavities can be found in areas with lots of standing deadwood, but sometimes this standing deadwood is removed for various reasons or there are no natural cavities suitable for nesting present in an area. Building nest boxes and placing them out in your gardens or other areas can make a difference for species where adequate nesting locations are limited. In addition, there is great

value in monitoring how well birds do at raising a brood of chicks, since that influences the number of individuals entering the breeding population in the future.

Although widespread, year-round residents, Northern Saw-whet Owls are a challenging species to confirm breeding for due to their cryptic appearance, secretive nature, and nocturnal habits. Fortunately, Northern Saw-whet Owls are a cavity nesting species and will readily nest in man-made nest boxes. Observing saw-whet owls at nest boxes can provide vital information about the species breeding behaviors and the outcome of their breeding efforts here in Maine.

Natural History

The Northern Saw-whet Owl is one of the smallest owls in North America. This tiny, nocturnal raptor has understated plumage mostly consisting of browns and white. This color pallet suits this species well to blend into the forest habitats it inhabits. Coniferous, deciduous, and mixed forests are regularly inhabited as well as coastal shrublands and even more open habitats such as powerline right-of-ways, so long as there is suitable nesting and hunting habitat.

Northern Saw-whet Owls forage for prey along forest edges and in clearings. Hunting takes place at night, generally from 30 minutes after sunset to 30 minutes before sunrise. These small owls look and listen for prey from lower perches like tree branches, shrubs, and fence posts. From their vantage points, saw-whet owls pounce on prey including small mammals such as mice, voles, and shrews and occasionally small songbird species and invertebrates such as beetles, grasshoppers, and spiders.

Northern Saw-whet Owls are a cavity nesting species. They do not, however, excavate or modify nesting cavities like woodpeckers, chickadees, or nuthatches. They instead rely upon the abandoned nest sites of woodpeckers, principally Northern Flicker and Pileated Woodpeckers. They prefer nest sites ranging from 10' to 15' in height that

are within or on the border of forested areas. Males occupy territories and advertise their presence with their monotonous, even pitched, rapid series of “toots” (*Dendroica* (<https://www.natureinstruct.org/dendroica/>) is great resource where you can look up any species and hear a variety of the sounds that they make). Female owls arrive on the territories in early spring. Once paired, females are responsible for selecting the nest site (although males may sing near suitable sites).

Northern Saw-whet Owls in Maine

As a state with considerable forest cover, Maine is well suited for Northern Saw-whet Owls. Consequently, the entire state falls within this tiny owl’s year-round range. While many saw-whet owls remain in the state through the winter months, Maine sees a pulse of migratory owls each spring and fall.

A Note on Other Small Owls in Maine

Although Northern Saw-whet Owls are the owl species mostly likely to take up residence in nest boxes in Maine, other uncommon to rare species may arrive and make use of the provided nest box. The breeding range of the Eastern Screech-Owl extends into the southwestern-most regions of the state. This small owl is a habitat generalist and may be found in more developed areas than the Northern Saw-whet Owl typically inhabits. The breeding range of a second owl, the Boreal Owl, falls just north of Maine. This species is associated with mature and boreal forest habitats. Both of these species are known to use man-made nest boxes. Should these species be encountered, continue your observations as outlined in this handbook.

Nest Box Monitoring

For this project, we are asking volunteers to install nest boxes in Northern Saw-whet Owl habitat and to monitor these boxes throughout the breeding season. The breeding season is a sensitive time for nesting birds. Because of this, our efforts are designed to minimize disruption that could lead to stress on these birds. The safety of the volunteers, the nesting adults, and their young is a priority. It is important to adhere to the monitoring protocol described below to best guarantee a successful season for all parties. Lastly, it is important to remember that if your nest box remains unoccupied, this is still important information. If no birds take up residence in a nest box this season, that is okay. We still would like for you to collect data that can be used to inform our effort. Give the birds some time to find your box, but if your box remains unused after many years, it is worth moving the box to a new location.

Where to Install Nest Boxes

Northern Saw-whet Owl nest boxes should be installed within or on the margins of forested areas, particularly those near swamps. Coniferous, deciduous, and mixed sites are all suitable options, and locations near areas of mature forest are ideal. Sites with small forest openings and near wetland or rivers, brooks, or streams are likely to be especially suitable. Sites which are extensively developed and with limited forest cover should not be used.

Nest boxes should be installed between 8' and 15' in height on a living tree. This means you will more than likely need to use a ladder to access the box during monitoring and maintenance. This may dictate where the box is installed as the ladder will need to be transported to the site on multiple occasions. Take extra care with ladders and make sure to have a second person present to help steady the ladder.

Placement and monitoring of nest boxes are potentially hazardous, and extreme care to your safety is the highest priority. Be familiar with the safe working practice for any tools you use. Beware of electricity from overhead power lines, particularly if carrying or placing a ladder, and keep nest boxes at least 50 feet away from power lines. Ensure your ladder is secure before you climb it. Please do not risk injury of any kind - the nest box and breeding observations are not worth the risk of an accident.

When possible, the box should be installed with its opening facing roughly south, although facing the opening in another direction is likely fine if it makes more sense at a location. This southern orientation of the cavity entrance may be an artifact of nesting in abandoned woodpecker cavities since woodpeckers are known to be particular about the orientation of their nesting cavities to reduce the effects of prevailing winds and take advantage of solar gain. While some cover (such as tree branches) is acceptable, the box should not be obscured, should be easily viewable from 30' away, and birds should have a clear flight path to the box. While volunteers are welcome to install and monitor more than one nest box, owl boxes should be installed a minimum of 800' apart.

Predators should be considered when picking a location for the nest box. It may be impossible to avoid all potential predators, but pay particular attention if the area has outdoor cats and pick a location for the box where cats cannot climb and access the nest box. If predators are a big problem in your area, consider adding a predator guard to keep them from reaching the box (<http://nestboxbuilder.com/nestbox-predator-controls.html>). In addition, if the area is known to have nesting Barred Owls and Great Horned Owls, these areas should also be avoided.

There are many methods for attaching nest boxes to trees, and you will need to use the method that best suits your particular needs. You can drill holes into a short piece of wood (wider than the nest box) and tie this tightly to the tree using wire (pad the wire to help protect the tree), then attach the nest box to that short piece of wood.

Monitoring Protocol

Here in Maine, the Northern Saw-whet Owl breeding season runs from approximately 1 April until 1 August. These safe dates indicate the time period where most migrating birds have already reached their breeding grounds. As such, these dates will serve as the start and end date for conducting nest box monitoring. Nest boxes (with coarse wood shavings – not sawdust – in the bottom of the box) should be installed by 15 March, when possible, to best ensure that the box is considered by arriving males.

It is important to remember that nest boxes are not always used immediately after they are put up (actually we expect less than 50% of boxes will be used in the first year), and we hope that this does not discourage you. Perseverance is essential as it takes time for birds to find a nest box and learn that it can be safe for nesting. If your nest box does not attract a nesting owl, it is not a wasted effort. Other species may still use the box for nesting or roosting.

April: Monitoring should be conducted once per week each week. During these first four weeks of monitoring ending on 30 April, observations should be limited to listening for owl vocalizations during the early nesting phase. The time and duration of your visit is up to you and your availability. We ask that you spend *at least* 15 minutes conducting observations per visit during this period. These observations should be conducted at night (at least thirty minutes after sunset). All observations should be entered onto your monitoring data sheet. Northern Saw-whet Owls are particularly sensitive to disturbance during the early weeks of nesting. **Do not approach within 30' the nest box during this sensitive period of the project.**

During the first few weeks of nest box monitoring, your observations may indicate that breeding is possible or probable. Make note of breeding behaviors you

observe during your monitoring visit on your data sheet. A possible indicator that Northern Saw-whet Owl breed in the area would be the presence of an adult in appropriate habitat (code **H**). You would use this code if you happened to see a silently perched owl during your observations. Hearing a singing owl (code **S**) is also a possible indicator of breeding. You can elevate the breeding certainty to "probable" if you hear the same species of owl singing in your block 7 or more days later (code **S7**). Remember that singing occurs well after sunset (typically peaking around 2 hours after sunset). While low temperatures do not typically hamper vocalizations, high winds and precipitation will inhibit owls from vocalizing.

May to August: During this latter part of the survey period (once eggs are suspected to have been laid), volunteers are asked to limit their observations to once every two weeks. During this part of the project, volunteers should view the inside of the nest box to note the number of eggs and/or nestlings. If you suspect that the young are getting close to fledging, do not check the nest as the young birds are liable to fledge prematurely if disturbed. This will likely require the use of a ladder to access the box, although some has successfully used a mirror or small video camera taped to an extension pole to observe the contents of the nest box. When using a ladder, securely place the ladder on the side of the box with the hinge (through which you will access the nest box). Carefully and quietly ascend the ladder to the nest box. Once at the nest box, gently tap the tree trunk or outside of the box (to encourage any adults to leave the box), open the box, count the number of adults, eggs, and/or nestlings without touching or disturbing any adults or young, and close and secure the nest box. If any young fledge prematurely with the disturbance, gather them up and put them back in the nest box. You may need to put your hand over the hole for a few minutes while the young settle before you can quietly move away. Take care to avoid inhaling any dust from old nests and always wash your hands after working at a nest.

While conducting visits to the nest box, it is important to work quickly and quietly. The amount of time spent at the open nest box should be limited to the time it takes to make your counts and no longer. In most instances this should be no longer than 10 to 15 seconds. **Do not touch the birds or reach into the box for any reason.** This work should be conducted as quietly possible. The data sheets should not be completed at nest box, but should be promptly completed once you are at least 30' away from the box. If the adults appear stressed by your presence, move back another 30'.

During the latter portion of the season, your observations will be largely focused on your nest box visits. You are encouraged to note any other observed breeding behaviors you see during this period on the comment section of your data sheet. Count the number of adults present when making your visit then count the number of eggs and/or nestlings visible during your nest box check. Northern Saw-whet Owl typically lay between 4 to 7 eggs. Eggs are not glossy and are typically white. Young nestlings are covered in a sparse coat of white down until molting into bold, brown juvenile plumage. Again, there is no reason to reach into the box or touch any of the birds. Simply note what you are able to see from your vantage point outside the box.

Reporting your results

Send your completed datasheets to Maine Natural History Observatory at the end of the field season (contact info on the datasheet). In addition, it is very helpful if you can enter these breeding records directly into the Maine Bird Atlas eBird portal (<https://ebird.org/atlasme/home>).

Maintaining Nest Boxes

Proper maintenance of a nest boxes is just as important as nest box placement. Nest boxes should be cleaned annually and, when necessary, repaired between seasons. At the end of the season (once all the young have fledged and the nest box is

unoccupied), take down the owl box. Leaving the box up between seasons will shorten the life of the box and could mean squirrels, wasps, mice, or other species could nest in the box. Take down the box, empty it of any nest materials (wear gloves), and store the nest box in a dry, protected place until the next field season. The remains of prey items may be discovered in the nest box at the end of the season. Do not use any cleaning solutions when cleaning out the box. If there is a build-up of debris stuck inside the box, use warm water and stiff-bristled brush to clean out the box (dry in the sun before storing). If any major repairs are needed, consult the nest box design instructions to complete the repairs yourself so long as you are comfortable doing so. Fresh, coarse wood shavings (2-3 inches deep) should be used to line the inside of the box when deployed each season. Sawdust should not be used as it will clog the drainage holes, hold moisture when wet, and could possibly cause drowning of the chicks.

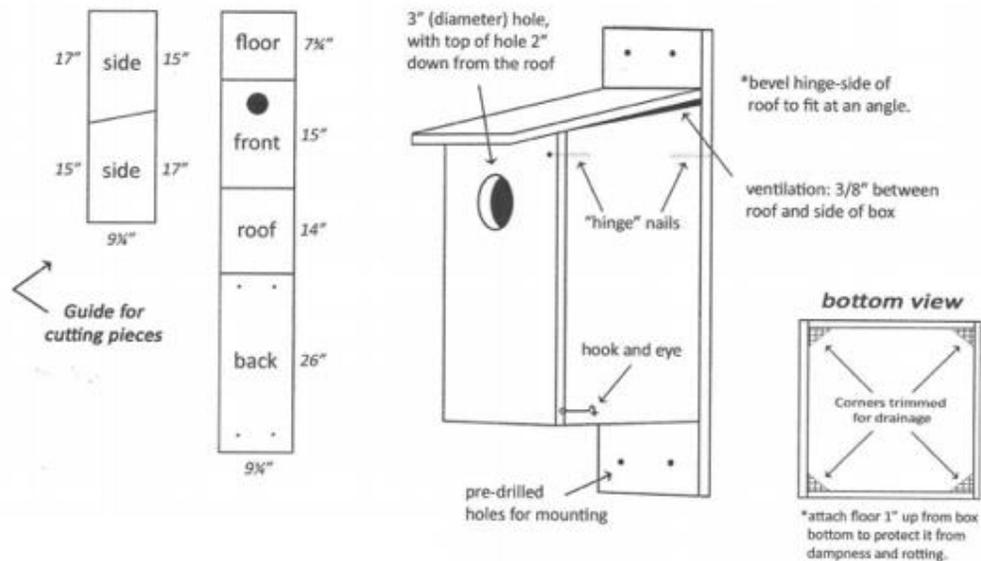
A note on competition with non-native bird species. Introduced Old World species such as European Starlings and House Sparrows often compete with native species for nest boxes. The larger diameter openings required for Northern Saw-whet Owl nest boxes make simply excluding these species impossible. These introduced species threaten native wildlife and are therefore not protected by state or federal laws. If Owls have already started using the box, they are usually successful in defending their box against these species. If Owls have not found the nest box, there are two options for if invasive bird species take up residence in your Northern Saw-whet Owl nest box. Option 1: Nest box removal. Once an invasive species moves into the box, it is very unlikely that owls will use the box that same field season. Therefore, volunteers who are comfortable doing so are welcome to remove nest boxes for the season and dispose of any materials, nests, and eggs associated with an invasive species discovered in a Northern Saw-whet Owl nest boxes. These contents should be disposed of well away from the nest box. Option 2: Continue your observations. While preventing invasive

species from nesting is the ideal solution, some volunteers may not feel comfortable disposing of invasive species nesting materials and eggs. That is okay. If that is the case, you are encouraged to continue your observations. If you observed European Starlings or House Sparrows entering the box, inspect the box as soon as possible to confirm the invasion and either remove the box for the season or continue making observations of the invasive species. If one of these non-native or any other native species takes up residence in your nest box(es), note the species in the comment section on your form. If a *native* bird species takes up residence in the box, simply make note on your data sheet and continue your observations. Native bird species should not be disrupted regardless of if they are the project's target species.

A note on competition with other wildlife. Occasionally, you may discover that other forms of wildlife have taken up residence in your nest box. These may include mice, squirrels, insects, and snakes. These animals can be removed from the nest box if you are comfortable doing so. Should you decide to remove these animals, proper precautions should be exercised during this type of maintenance. If rodent nests are found within the box, remove the contents with gloved hands. Small paper wasp nests can be manually removed from boxes and destroyed with a gloved hand. Do **not** use any insecticides to exterminate insects as these products may contain chemicals which can be hazardous to nesting birds using the box. If a particularly large nest of stinging insects is suspected or detected, make note. Large stinging insect nests will likely have to be removed at the end of the season. Unless discovered and removed quickly at the beginning of the season, the presence of any of the animals discussed above will likely mean owls do not use the nest box this field season. Any box which is invaded by these non-bird animals should be relocated to a new location the following field season. Do **not** risk injury for the sake of nest box maintenance.

Nest Box Plans

A good nest box design must be secure from predators, weatherproof, simple and inexpensive to construct, monitor, and maintain, and the target species must accept and use the box to successfully fledge healthy young. A limited number of Owl nest boxes are available free to volunteers. If we have run out of our supply of nest boxes, you can get on a waiting list when additional nest boxes are available, or you can build your own using the plans below. See the "Contact" section should you have any questions about the nest box plans. These nest plans were generously shared by The Peregrine Fund. Note that the dimensions given in these plans do not need to be measured to the nearest fraction of an inch - natural nest holes where owls nest are variable in size and their openings also differ in size and shape. There is room for experimentation in nest box design, defense against predators, and location. Using wood from scrap piles or even driftwood will help to keep costs down. **Do not paint or treat the wood for a nest box with any preservatives.** Do not add a perch to the box as they are not needed by owls and would provide a foothold for predators. It is often helpful to use a marker to number your nest boxes so that it is easier to keep track of multiple nest boxes.



Materials.

- (1) 8' 1"x10", White Pine or Cedar
- Coarse wood shavings (to line the bottom of the nest box)
- (20-30) 1 1/2" Exterior Screws (trimhead)
- (2) 8 Penny Common Nails, galvanized (for hinge)
- (4) 3" wood screws or galvanized lag screws and washers (for mounting)
- (1) 2" hook and eye (for locking the nest box)
- Cordless Drill
- Staple Gun and staples
- Table Saw
- Skill Saw or Chop Saw
- Jig Saw or 3" hole saw
- Hammer

Instructions:

1. Begin by gathering all necessary tools and nest box components. Your materials should consist of a Front, Fixed Side, Opening Side, Bottom, Back, Roof, and a latch (to secure the opening side).
2. Preassemble the nest box to ensure the fit of each part. Make adjustments as necessary.
3. With the box still preassembled, attach the Front of the box to the Fixed Side and the Bottom with 1 ½" exterior screws. **Special note:** The Bottom should be installed approximately 1/2"-1" from the bottom edge of the front and sides of the box. This will help prevent rain from running into the box during storm events.
4. Place the box with the Front facing down and fasten the Back of the box to the Fixed Side and Bottom with 1 ½" exterior screws. Install roughly 4"-5" from the top/bottom of the Back (thus leaving room to mount the box to a tree, building, or post in the spring).
5. Turn the box over with the Back facing down. Fasten the Roof to the Front, Back, and Fixed Side of the box using 1 ½" exterior screws. **Do not** attach the Roof to the Opening Side.
6. Now to install the opening side. Ensure that there is large enough gap at the top of the Opening Side so that you can open the box once the hinge nails are installed. Hammer a galvanized nail through the Front of the box through the top of the Opening Side. Turn the box over and nail through the Back of the box into the Opening Side exactly opposite the first nail. These nails will function as a hinge.
7. Install the hook and eye latch on the bottom of the Opening Side. This will keep the Opening Side of the box securely fastened.
8. Place the box with the Front facing up. Using a 3" hole saw (a 2 ½ " to 3 ½ hole will work), cut an opening through the front of the box. Clean out debris from inside the box.
9. Line the inside of the back with 2"-3" of course wood shavings (not sawdust).
10. The nest box is ready to deploy!

Helpful tips:

- Predrilling all your holes will help prevent splitting when fastening the box together.
- **Do not** use wood glue on your nest box. Doing so will make replacing a damaged component on the box far more difficult. Instead, use a thin bead of acrylic latex caulk along the seams of the box (barring the Opening Side). As the nest box continues to dry and shrink, you can add additional caulk to seal any cracks that form.

- You can add a piece of hardware cloth or a small block on the inside of the box below the opening to make it easier for nestlings to access the opening.

Contact

For questions regarding this project, please contact:
Logan Parker, Maine Natural History Observatory
(207) 649-4689 (cell) – logan@hereinthewild.com

Email scans of completed data sheets to:
logan@hereinthewild.com

or mail to:
316 Chisholm Pond Road, Palermo, ME 04354