Maine Northern Saw-whet Owl

Nest Box Monitoring Program

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A Project of

Maine Natural History Observatory

Introduction

Thank you for your interest in Maine's Northern Saw-whet Owl Nest Box Monitoring Program. This is a project coordinated by Maine Natural History Observatory in partnership with Project Owlnet and 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 boxes throughout the breeding season and clean out the boxes each winter. 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 areas of suitable habitat 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 shrubby powerline right-of-ways, so long as there is suitable nesting and hunting habitat.

Northern Saw-whet Owls forage for prey in a variety of dense and/or shrubby habitats where larger owls will have difficulty preying on the smaller saw-whet owl. 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. Many males occupy territories throughout the year in areas with suitable nest cavities and during the breeding season advertise their presence with a monotonous, even pitched, rapid series of "toots" [Dendroica (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 nest cavities).

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 male saw-whet owls remain in the state through the winter months, most females migrate south for the winter. Maine sees pulses of migratory owls as females leave and return to the region while other owls from further north pass through the state 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 much rarer Boreal Owl, falls just north of Maine. This species may be associated with mature boreal forest habitats of western,

northern, and downeast Maine. 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 six 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 or areas of dense forest and shrubs. Coniferous, deciduous, and mixed sites are all suitable options, and locations near areas of dense 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 or snag (dead 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′ 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 winter winds and take advantage of solar gain. While some cover (such as tree branches) is acceptable, the box entrance should not be obscured, should be easily viewable from 30′ away, and birds should have a clear flight path to the box. While any single box can be used, clusters of 5-10 boxes are more likely to successfully attract a breeding pair of owls. When creating a cluster of boxes, they can be spaced as close as 50-100′ or as far as 300′. If multiple clusters are being installed in good habitat, the outermost boxes in a cluster should be spaced at least 1500′ 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 - a 2' metal guard wrapped around the tree will help - to keep them from reaching the box. 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 needs. You can drill holes into a short piece of wood (wider than the nest box) or the sides of 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 March until 1 August. Nest boxes (with coarse wood shavings – not sawdust – in the bottom of the box) should be installed by 15 February, when possible, to best ensure that the box is considered by attending males. The addition of wood shavings is an important step as these shavings help insulate the eggs/young and keep eggs from rolling inside the box.

It is important to remember that nest boxes are not always used immediately after they are put up (actually we expect less than 15% 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 1-15: During the first half of April, monitoring can be conducted once per week, if desired. During these first two weeks of monitoring ending on 15 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. If monitoring for vocalizations we ask that you spend *at least* 15 minutes conducting observations per visit. 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 from early March through 15 April. **Do not approach within 30' of the nest box during this sensitive period of the project.**

During the first two 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.

April 15 to August: During this latter part of the survey period, volunteers are asked to limit their observations to once every three weeks. Monitors should make brief nest box checks to note the number of eggs and/or nestlings. If you suspect that young are getting close to fledging, do not check the nest as the young birds are liable to fledge prematurely if disturbed. Checking nest boxes will likely require the use of a ladder to access the box, although some have 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 top of the ladder on the side of the tree a few inches below the box on the box side 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 as possible. The data sheets should not be completed at the nest box, but should be promptly completed once you have closed up the box and have moved 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 box is just as important as nest box placement. Nest boxes should be left out between breeding seasons, cleaned annually and, when necessary, repaired. As nest boxes age they will become more attractive to breeding owls. The remains of prey items may be discovered in the nest box at the end of the season. Any prey remains should be removed. Do not use any cleaning solutions when cleaning out the box. If any major repairs are needed, consult the nest box design instructions to complete the repairs yourself, as long as you are comfortable doing so. An alternative to repair is replacing the box with a new box. Fresh, coarse wood shavings (2-3 inches deep) should be added to the box when depleted, badly soiled or rotted. Sawdust should not be used as it will clog the drainage holes, hold moisture when wet, and could possibly cause drowning of the chicks. The addition of wood shavings is an important step as these shavings help insulate the eggs/young and keep eggs from rolling inside the box.

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 observe 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. 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.

Nest Box Building Instructions

These directions are for a box that has been used by Eastern Screech Owls and Northern Saw-whet Owls. It was adapted from a couple of designs; the elegant beveled edge front door panel was invented by Al Preston and allows for very quick and easy inspection and cleaning of the box. We use 1" lumber (actually 3/4" thick). No painting is required.

1.) Cut the lumber into pieces of the proper size. Each box requires 48" of 1 x 8 and 47" of 1 x 10 cut into:

1 back 8 x 21 1/2" tall,
2 sides 10 x 18",
1 front 8 x 17 1/4",
1 bottom 8 x 9 1/4",
1 roof 10 x 11", and also
1 predator plate 4 x 4” oak block.

2.) Cut the top edge of the front piece at a 45 degree angle. Then cut the front piece into 2 sections with a table saw beveled at 45 degrees. If you’re making a lot of

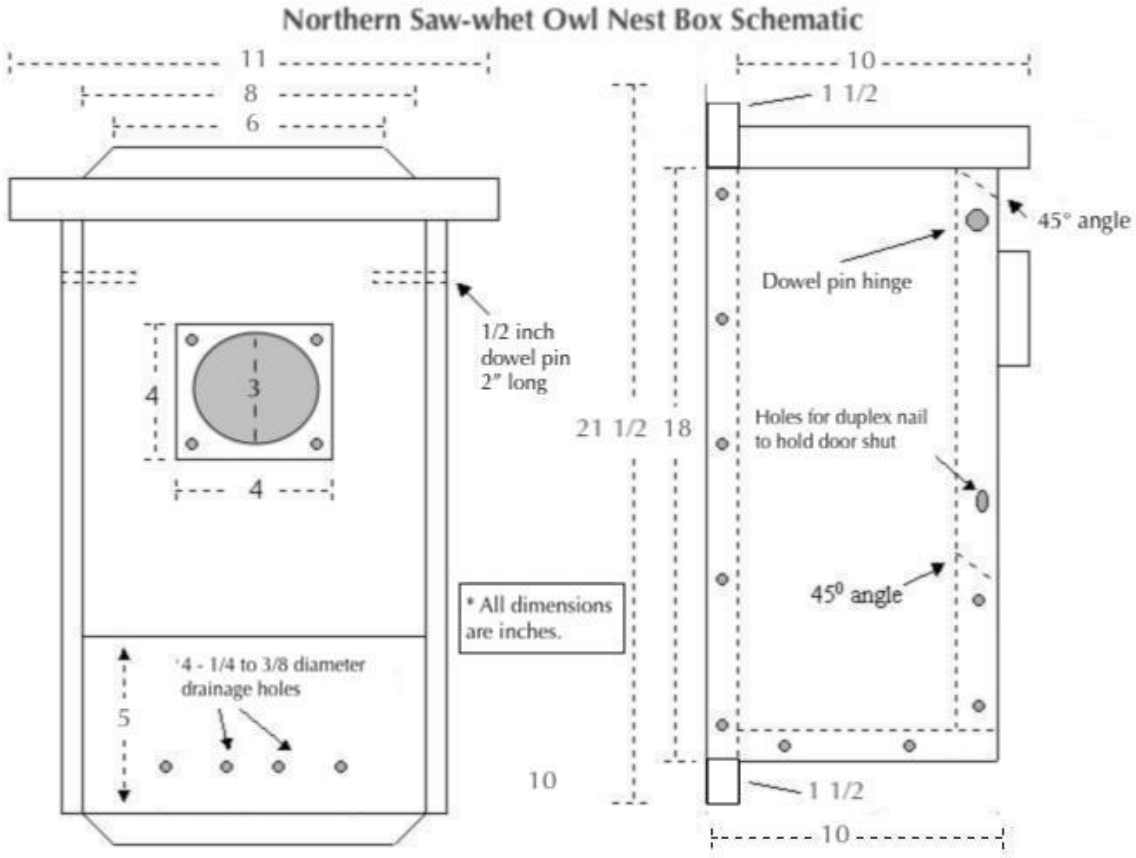
boxes, it's best to mark these sections with a pencil to keep track of which pieces belong together.

3.) Cut a 3" diameter hole in the front piece so that there is about 3" of wood between top of the piece and top of the hole. Rough up one side of this piece below the hole with a saw; this will be the inside of the front and the rough surface will make it easier for owls to get to the hole. Secure the 4 x 4" predator plate over the door hole.

4.) Put the back of the box on edge and nail the left side to it so that 3" of the back sticks out above and below the side. Repeat for the right side. Insert and square up the bottom of the box, there will be space remaining for the front piece, nail the bottom to the sides. Finish with the front piece. Make sure that the rough side of the front is inside the box. Slip the bottom into place, square it with the bottom and two sides and nail it to the side pieces already in place. Now take the top section and put it in place. This side will be slightly shorter than the two sides because of the internal saw cut, slide it down to snugly meet the bottom of the front section. There will be a small space at the top of the front piece equal to the thickness of the saw cut. Drill the two dowel holes and inset the dowels that serve as hinge pins. Drill the holes for the nails that secure the door. The roof can now be nailed to the sides. Drill drainage holes in the bottom of the box.

Back 21 1/2”	Front 17 1/4”	Bottom 9 1/4”	Back 21 1/2”	Front 17 1/4”	Bottom 9 1/4”

Side 18”	Side 18”	Roof 11”	Side 18”	Side 18”	Roof 11”



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:

272 Chisholm Pond Road, Palermo, ME 04354