



Ontario Long-eared Owl Survey

INSTRUCTION MANUAL

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July 2021

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The Ontario Breeding Bird Atlas is a partnership project of:



Ontario Ministry of
Natural Resources and
Forestry

This project was undertaken in partnership with
Ce projet a été réalisé en partenariat avec



Environment and
Climate Change Canada

Environnement et
Changement climatique Canada



Thank you very much to the [Ontario Breeding Bird Atlas Supporters](#)

Long-eared Owl Survey: Quick Guide

Skill Level:	Ability to identify juvenile Long-eared Owl calls, as well as the calls of adult Long-eared Owls.
Timing:	July 1 to August 14. Start between 30-min after sunset and end before 30-min before sunrise.
Duration:	Requires 2-3 hours to complete (10 survey stations at 5 minutes each, plus travel between).
Location:	Throughout Ontario.
<i>Atlas Square:</i>	Contact the Regional Coordinator for assignment to an available square.
<i>Survey stations:</i>	Use numbered Atlas point count stations - the 10 lowest numbered stations with suitable habitat that are at least 1 km apart.
Considerations:	
<i>Weather:</i>	Survey on calm, mild nights with high visibility and little precipitation. Winds should be < 19 km/h (Beaufort 1-3).
<i>Equipment:</i>	<p>This particular survey does not use recorded sounds to elicit a response from owls; however, you will require a reliable timing device as you must record your observations in one-minute intervals over a five-minute survey period. You may also want to carry a device capable of recording sounds that you are not able to identify in the field.</p> <p>A safety kit and wearing a high visibility safety vest is highly recommended.</p>

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Introduction

Thank you for your interest in the Long-eared Owl Survey. Your contribution will aid in the understanding of Long-eared Owl populations in Ontario.

The Ontario Long-eared Owl Survey is an excellent opportunity for new and experienced birders. While you do need good hearing, the required bird identification skill level is considered as easy because **your primary focus on this survey will be to listen for the begging calls of juvenile Long-eared Owls.** By listening to a few recordings of juvenile (and adult Long-eared Owls), you should be able to recognize their calls under field conditions (see **Training** on page 7). Familiarity with other owl species, other nocturnal bird species, and even other nocturnal animal species, is beneficial but not required .

Long-eared Owls are notoriously secretive and often escape detection when employing conventional owl survey techniques; however, juvenile Long-eared Owls are often very persistent callers. Begging calls of juvenile Long-eared Owls are reminiscent of a weak jay or Killdeer call. Given their persistent calling, surveying at a time when juveniles are present is generally the most effective and efficient way to locate breeding Long-eared Owls.

Unlike most surveys, the Long-eared Owl Survey does not use recordings (playback) to elicit a response. The protocol consists entirely of passive listening (5 minutes in total, divided into one-minute intervals) and your focus will be primarily on listening for begging calls of juvenile Long-eared Owls.

The Ontario Long-eared Owl Survey is being undertaken as part of a larger project, the Ontario Breeding Bird Atlas-3 which takes place from 2021 through 2025. For more information on the Atlas, see www.birdsontario.org.

The Ontario Long-eared Owl Survey complements, but is not the same as, the Ontario Owl Survey coordinated by Birds Canada. The Ontario Owl Survey is a provincial program designed for the long-term monitoring of Owl populations within the Ontario Ministry of Natural Resources and Forestry (OMNRF) Area of the Undertaking (see www.birdscanada.org/ON_Owls). This program, and its existing routes, will continue to be surveyed during the period of the Ontario Breeding Bird Atlas-3, from 2021 through 2025. If you are interested in participating in the Ontario Owl Survey during the Atlas, please visit the owl route map available at www.birdscanada.org/on_owls to see if there is an available route in your area. If a route is assigned to you, please follow all of the protocols outlined in the Ontario Owl Survey.

If there are no Ontario Owl Survey routes available in your region and you still wish to survey owls, then please contact an Ontario Breeding Bird Atlas Regional Coordinator to locate the nearest Atlas survey square that is available for owl surveys. Once a square has been assigned to you, then please follow the appropriate Ontario Atlas-3 Owl protocol(s) to complete your surveys.

Owls represent a special challenge to monitor because they are difficult to survey. They breed early in the year, are secretive, primarily nocturnal and roost in concealed locations during the

day. As a result, special surveys are required to better document the distribution and abundance of most of Ontario's owls. For Atlas-3, we have developed the following five protocols: Eastern Screech-Owl; Barred and Northern Saw-whet Owl; Great Gray and Boreal Owl; Long-eared Owl; and Northern Hawk-Owl. Figure 1 shows the part of the province where each survey should take place.

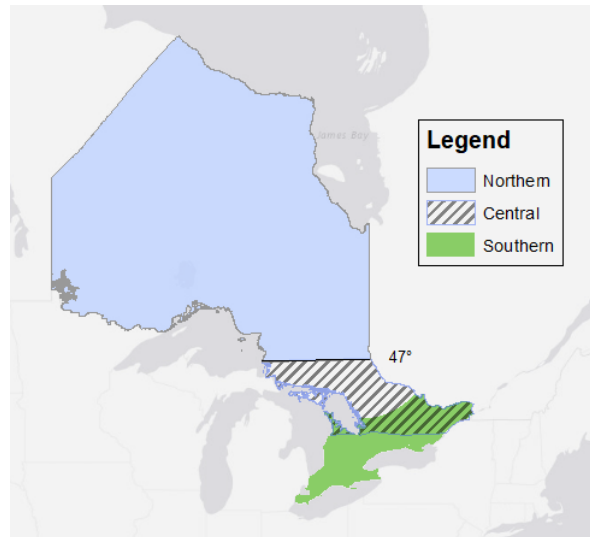


Figure 1. The Great Gray Owl-Boreal Owl survey and the Northern Hawk-Owl survey should be run in the “North” section; the Barred Owl and Northern Saw-whet survey should be run in the “Central” section; and the Eastern Screech-Owl survey should be run in the “Southern” section. The Long-eared Owl survey can be run in any section.

The Great Horned Owl occurs throughout Ontario, and although we encourage participants to seek we do not have a specific survey for that species. They do not consistently respond to playback and use a wide variety of habitats, so aren't well suited to a focused survey. Nevertheless, they call at night and could be heard during any of the Atlas' standard owl surveys. We will use the Great Horned Owl data collected in this and other Atlas surveys to map GHOW relative abundance.

Draft results from the Long-eared Owl Survey, and the other owl surveys, will be posted on the Atlas project webpage. Maps of Long-eared Owl relative abundance and breeding distribution will be created based on the survey results and other atlas data for publication in the final atlas.

Thank you for contributing to the survey!

Ontario Long-eared Owl (LEOW) Survey Guidelines

Preparing for your survey

No Survey playback

This is a passive survey protocol so there is no playback used during the five-minute survey period. You will have to rely on your timing device to ensure you record your observations in the appropriate time period. Remember the +1 principle; for example, if you observe a Long-eared Owl at 2:02, you will enter the observation in the **third** minute of the five-minute survey period.

Note - Please ensure that you do not broadcast any recordings of owls or other species before or during this five-minute period.

Training

Before surveying, familiarize yourself with **both the juvenile and adult** calls of the Long-eared Owl (see [Appendix A](#)) and other owl species that are found in your area of Ontario. **Your primary focus on this survey will be to listen for the begging calls of juvenile Long-eared Owls.**

Begging calls of juvenile Long-eared Owls are reminiscent of a weak jay or Killdeer call; the pitch and quality may vary according to age and sex, but the pattern of the call is generally the same: **single notes, evenly spaced up to a few seconds apart**, often given continuously for long periods of time (similar in pattern to the primary call of an adult male Long-eared Owl but very different in quality).

So, of course, you should be familiar with the calls of Blue Jay (unlikely to be encountered at night) and Killdeer (very likely to be encountered at night) because these species' calls can be reminiscent of the calls of juvenile Long-eared Owls.

In all regions, it is helpful to know or learn the calls of both **adult and juvenile** Barred Owl, Northern Saw-whet Owl, Great Horned Owl, and Short-eared Owl. In addition, southern and central Ontario observers may encounter the calls of Eastern Screech-Owl and central and northern Ontario observers may encounter the calls of Boreal Owl and Great Gray Owl. Beyond this, you might want to familiarize yourself with other nocturnal calling species.

Although it is often somewhat quiet at night at this time of year, there is a long list of nocturnal animal species that you might encounter on your survey. Bird species include the various owl species, and other species that have calls that can be reminiscent of owls including Killdeer, Mourning Dove, Least Bittern, and both Black-billed and Yellow-billed Cuckoo. You should also be familiar with the calls of Eastern Whip-poor-will and Common Nighthawk as these are species of interest. Other bird species may be calling including Upland Sandpiper (which will be migrating at the time of the survey), American Woodcock, Wilson's Snipe, rails, and herons.

You may also find it easier to rule out owls and other bird species if you are aware of the sounds of certain nocturnal mammals such as Red Fox, Coyote, Common Raccoon, and Porcupine. Most frogs and toads will have stopped calling at this time of year, but some will

still be encountered (be aware of Spring Peeper and American Toad), while the singing of crickets and katydids will be on the increase throughout the period (some of which sound like American Toad).

Examples of some of these calls are provided on the [Atlas website](#). The bird sounds are also available on [Dendroica](#) and [Xeno-canto](#), and phone apps such as Merlin.

All of this to say that while you may not know all of these nighttime sounds, you should be aware of the possibilities. But don't let your lack of experience dissuade you from conducting this survey because **what you really need to know** are the calls of Long-eared Owls, and the calls of juvenile Long-eared Owls in particular.

You are encouraged to carry a recording device as you may be able to determine the identity of a calling species after the fact. There are good recording apps (such as RecForge II Pro) that you can download to your smartphone. Alternatively, you can simply use the video function on your phone to capture the sound.

Equipment

Make sure you have all the required equipment before heading out.

- This manual, either in hard copy or on your phone.
- A map of the 10-km square you are to survey showing the survey stations. Either a hard copy map, or a map of downloaded survey (point count) locations (see link for more information), or the map on the NatureCounts Atlas app.
- The LEOW data form
- A good time-keeping device (watch or phone)
- Flashlight or headlamp
- Clipboard
- Compass
- Road map or GPS
- Spare batteries and/or charging cord
- Pen or pencil if using the hard copy data form
- Recommended: a recording device in case you cannot identify the calling species.

Survey area

The Long-eared Owl should be conducted anywhere in the province of Ontario that has suitable nesting habitat.

Which squares to cover?

We would like Long-eared Owl surveys to be undertaken in as many of the 10-km squares as possible. For the first two years of the Atlas (2021-2022), we will not be targeting specific 10-km squares - surveys can be run in any square. After that, we will assess coverage needs and start to pick specific squares to fill in gaps in coverage. A map of 10-km squares is available [here](#).

We encourage you to do as many of these squares as you like but **please inform your [Regional Coordinator](#) of which square(s) you plan to cover** to avoid duplicating effort with other participants.

Planning your survey

Survey timing

You should complete your survey between July 1 and August 14.

Time of day

We recommend that surveys begin about one half hour after sunset, but they can be run anytime between a half hour after sunset and a half hour before dawn.

Weather conditions

Weather has a great influence on our ability to hear owls; calm conditions are best. Wind and precipitation critically reduce owl calling and impact your ability to hear. Surveys should be conducted on nights with wind less than 19 km/hr (i.e., 3 or less on the Beaufort Scale, which is enough to constantly move twigs and to extend a small flag). There is little point in attempting or continuing a survey if the wind exceeds force 3 or if there is persistent rain. If you have started a survey and the weather conditions worsen during the survey to a point where they are unsuitable, simply stop the survey and finish it another night.

Time required

It takes approximately 2-3 hours to run the full 10-station survey. Ideally, survey all stations in a 10-km square on the same night. If you are unable to complete the survey on a single night (e.g., due to poor weather conditions), simply complete the remaining stations (to make a total of 10 stations surveyed) on another night and use a separate data form/app submission to record your results.

Tip - Be sure to test your time-keeping equipment before heading into the field. Bring a backup timing device in case your preferred timing fails, as you are required to record your observations in one-minute intervals.

Completing your survey

Locating designated survey stations

There are 40 randomly selected, designated roadside point count survey stations located within each square. These are marked on the map of each 10-km square. Maps of each 10-km square as well as point count survey station coordinates are available [here](#), and on the NatureCounts app. To select stations for your surveys, start with designated survey station number 1 and check each designated station on the map sequentially (1, then 2, then 3, etc.), until you have selected the first 10 designated survey stations that have suitable habitat for Long-eared Owls (see below regarding suitable stations). Ensure that all survey stations are at least 1.0 km apart. It can be helpful to line up a few extra “backup” designated stations in case

you need to switch stations during the survey, e.g., if traffic is too heavy at a preselected station.

We recommend that you go into the field during daylight hours to locate each station. This makes it easier to find the station when you go back after dark.

If you arrive at a station and realize that it is not suitable, you should reject this station and find a new one among the designated stations using the same rules as above (first check number 11, then 12, etc.). The 10 stations can be surveyed in the most convenient order (not necessarily sequentially 1-10). If you cannot find 10 suitable survey stations in your square using the rules above, then create your own “undesigned” survey stations to bring the total to 10, as described below.

Once you arrive at the designated station (as precisely as you can determine it using the map or GPS), complete the survey as close as possible to designated coordinates. For more information on reading UTM coordinates from GPS units or smartphones, see [Appendix B](#).

Locating undesigned survey stations

If you cannot find 10 “suitable” designated stations, please add some undesigned survey stations to round the total up to 10. Undesigned points can be set up in any location that you think might be suitable for Long-eared Owls; however, it is essential you do not include undesigned stations **known** to have owls in this standardized survey because this would bias your survey results.

Undesigned survey stations can be located in off-road stations, if you like. The coordinates of each undesigned station should be recorded on the data form. For information on how to determine UTM location using the map provided, see [Appendix B](#).

Determining “suitable” stations

Suitable stations are those that are:

- physically accessible at the time of year of the survey
- legally accessible (no trespassing)
- near a safe parking spot
- in a quiet location where traffic does not significantly impact your hearing or safety.
- not directly in front of a house
- designated stations should be within 100 m of suitable habitat
- undesigned stations should be in or within 100 m of suitable habitat
- more than 1 km from any other Long-eared Owl survey station.

Suitable habitat

The Long-eared Owl breeds in suitable habitat throughout all of Ontario except perhaps the northern extreme of the Hudson Bay Lowlands. Breeding habitat varies geographically, but

they generally prefer a mix of forested and open habitats, so you should select stations with dense conifers (such as cedar or young pine groves) or dense deciduous brush near meadows or grassy fields.

Survey protocol

No playback is used for this survey so you will have to rely on your timing device. A reminder to use the +1 principle to keep your one-minute time periods straight: for example, if you observe a Long-eared Owl at 2:02 into your five-minute stop, you will enter the observation in the **third** minute of the five-minute survey period. To start the survey, move at least 20 metres away from your vehicle. This will reduce noise interference from the engine as it cools and will enable you to hear the owls. While you will be listening for all owls, nightjars, and other bird species, **remember to be focused on listening for the begging calls of juvenile Long-eared Owls.**

Data collection

We recommend doing all 10 survey stations in one evening, but the 10 stations can be done over more than one evening should that be necessary or more convenient. Data are collected using a paper Survey Form, as described below in the Entering Owl survey data section. Please be sure to complete every field as missing information may cause a data entry error.

“No owls” is very important data! Please follow the protocol, run the full survey, and complete the requested data form for each station, whether or not you actually hear or see an owl. Negative data are as important as owl detections – they help us gain insight into the relative abundance of owls across the province. See below for how to complete the data form.

Safety issues

See [Appendix C](#). Please have fun but make sure you are safe. Carry a cell-phone and have a friend accompany you on owling outings. They provide a safety factor and can help with the survey – juggling the timing device, map, GPS, flashlight, and the data forms can be challenging for one person. It’s a good idea to let someone know where you plan to be travelling, and when you expect to return. Double-check the survey locations in advance and during daylight to ensure the roads are accessible at the time of your survey. Dress for cooler night-time temperatures and wear highly visible clothing, a safety vest is recommended. *Please be careful when standing on roadsides at night and while driving on rough roads.* Be careful to ensure your car is pulled completely off the road.

Once you have surveyed the 10 stations and entered the data (see below), you have completed the minimum requirement for the survey in that square. Congratulations, and thank you!

If you were not able to complete all 10 stations, please try to complete the remaining stations on another night. Simply fill out a second data form and submit both forms. If you are unable to complete the remaining stations on another night, submit the results for the stations you were able to complete. This information will still be usable in the final analysis.

If you completed 10 stations and would like to do additional surveys, please select another square to survey. Please check with your Regional Coordinator to find a square needing coverage and avoid duplicating effort.

Entering LEOW survey data

You should record the data for your survey on the hard copy data form in the field then enter the data via NatureCounts on the Atlas Website.

Using NatureCounts

To use **NatureCounts** you need your NatureCounts login information. You would have created a NatureCounts profile, login name and password when you registered to participate in the atlas. NatureCounts can be accessed by logging in via the Atlas Website.

Using the Owl Survey Data Form

Missed fields - Don't miss fields on the forms as missing information may cause a data entry error that prevents you from submitting your data. See the sample completed form in [Appendix D](#).

Square ID: Fill in the 7 digit number, e.g., 17TNU61

Name: Fill in your full name.

Date: Record the year, month and day of your survey. If you have done the survey on more than one night, use a new data form for each night.

Comments: Fill in any pertinent information.

Station # (Point Count #): Fill in the number of the point count station where you did your survey.

Time: Record the time you start the survey at that station. Use the 24-hour clock: 7:30 p.m. is 19:30.

Survey Data - Each line in this table is used to record data on each individual owl reported at each survey station, i.e. one line for every bird. In the example that is presented in [Appendix D](#), at this one station (Station 2), four owls were heard: two juvenile Long-eared Owls, one adult Long-eared Owl and one Barred Owl, and each is recorded on a separate line. Use a second form if you require more space to record additional owls.

If no birds are heard at a station, record the Date, Time, "# cars" and Noise, and leave the other columns blank.

Start Time: Record the time you start the survey at that station. Use the 24-hour clock: 7:30 p.m. is 19:30.

Species Codes: Species codes are listed on the data form and most follow AOC guidelines. The target species is:

LEOW – Long-eared Owl

Some other owls for which you can collect breeding data while doing your surveys are:

BDOW – Barred Owl (Note: BDOW is used to separate it from Barn Owl, BNOW)

SEOW – Short-eared Owl

BOOW – Boreal Owl

GGOW – Great Gray Owl.

All or part of the Long-eared Owl survey period is past the safe breeding dates for the following species:

GHOW – Great Horned Owl (June 30)

EASO – Eastern Screech-Owl (July 15)

NHOW – Northern Hawk Owl (July 15)

NSWO – Northern Saw-whet Owl (July 31)

If you observe breeding evidence of any species beyond the safe date period, be sure to provide sufficient detail to support (or question) the validity of the breeding evidence.

Recording Owls: The form is designed to **identify each minute** in which you observe each individual owl as this will help us better understand owl detectability.

When an owl is heard, record the species name in the column labeled “Species Code,” then place an “X” in the column(s) corresponding to when that owl was heard (e.g. if an owl is heard calling during the second silent listening period, place an “X” in the column titled, “2nd minute.” If the owl is heard during every listening period, place an “X” in every column). If you see an owl, put an “S” in the appropriate column. If the owl was both seen and heard, use “XS”. Use a separate line for each individual owl. Also, we are not interested in how many times an owl calls during a particular listening period. Use only one “X” to denote that an owl called during that minute, regardless of whether it called once, or 20 times. If known, add the highest appropriate breeding evidence code under the field Breeding Code - juvenile owls should be recorded as FY (for Fledged Young). Only owls heard or seen between the start and end of the 5-minute Long-eared Owl survey period should be tallied. If you do hear other birds after the 5-minute period, they can be reported to the Atlas as Incidental records. **Juvenile owls of any species can be coded FY.**

In the example found in [Appendix D \(Figure 2\)](#), your first stop with suitable habitat is station #2. There were four owls: two juvenile Long-eared Owls were heard immediately upon the start of the survey and called throughout the survey period; during the 3rd minute a (presumed) adult was observed flying by, giving a call; and then a Barred Owl called during the 4th survey minute.

Direction: the **direction** at which the bird was **first** heard or seen by providing cardinal directions (N, NE, E etc.) or a compass reading.

In the example, the two juvenile Long-eared Owls were northeast of the survey station when first heard, the adult Long-eared Owl was seen and heard flying to the north, and the Great Horned Owl was west of the survey station.

Distance: Put an “X” in the appropriate box to indicate the distance category (<200 m, 200-500 m, 500-1000 m or 1000+ m) in which the bird was first heard. In the example, the two juvenile Long-eared Owls were estimated to be 200-500m, the adult Long-eared Owl was less than 200 m away, and the Barred Owl 500-1000 m away,

cars: Record the number of vehicles that passed by that station during the survey period. In the example, 2 cars passed the survey station during the survey.

Noise: Record number 1 to 4 based on the following scale:

1. None or slight: relatively quiet, little interference.
2. Moderate: some interference with broadcast and/or listening.
3. High: substantial interference with broadcast and/or listening.
4. Excessive noise: extreme interference with broadcast or listening.

If there is excessive noise or too much traffic at one station to survey properly, we recommend stopping the survey, erasing any data that you may have recorded from that station, and selecting a different station using the procedure described above.

In the example, there was little noise during the survey of Station 2.

Remarks: Record comments such as what caused the noise, breeding evidence (such as duetting), or what type of call was made by the owl.

Evidence of breeding: These codes can be used in the breeding code field. Enter the highest (furthest down the list) 1- or 2-letter breeding code that best describes the situation. The full set of Atlas breeding codes and definitions are provided [here](#). The most likely codes during an owl survey at this time of year are:

Code Definition

H	Species observed in suitable nesting Habitat during its breeding season.
S	Singing male or adult producing other sounds associated with breeding (e.g., calls or drumming) in suitable nesting habitat during the species’ breeding season.
P	Pair observed in suitable nesting habitat during the species’ breeding season.
A	Agitated behavior or alarm calls of an adult in suitable nesting habitat during the species’ breeding season.
FY	Recently Fledged Young (nidicolous species – whose young are raised in a nest) or downy young (nidifugous species – whose young leave the nest soon after hatching) incapable of sustained flight.

In the [example](#), both FY and A were observed for the Long-eared Owls; FY is the higher breeding evidence. A Barred Owl called in the fourth minute and S was entered as breeding evidence.

It is important to keep straight the difference between survey codes and breeding evidence codes. Sorry for the confusion on this, but we have adopted Birds Canada's Owl Survey protocol and that survey happens to use X and S for different purposes than the Atlas does:

Code	Owl survey code meaning	Breeding evidence code meaning
X	A bird that is heard on the survey	An observation of a non-breeder
S	A bird that is seen on the survey	A singing bird or adult producing other sounds associated with breeding.

Unknown owl species: If you hear an owl (or what seems to be an owl) but can't identify it, enter "UNKO" as the 4 letter species code and enter the rest of the data. In the comments section, please describe what you heard in as much detail as possible and we will try to ID it. If you can do so, please provide a recording of the vocalization taken in the field.

If you come across nightjars or other non-owl bird species, you should also record them on your data form in the **Other species** section. This is a special section at the end of the form for other crepuscular species observed.

In the example found in [Appendix D](#) (Figure 3) the observer also heard an Eastern Whip-poor-will (EWPW) at the station and entered it under **Other Species** at the bottom of the second page of the form and entered "S" for the breeding evidence.

Note the end of safe dates for our two regular nightjar species:

CONI – Common Nighthawk (July 31)

EWPW – Eastern Whip-poor-will (July 31)

The entry in Figure 3 would certainly be the correct entry if the survey was conducted between July 1 and July 31 of the Long-eared Owl Survey period. If the survey had been conducted between August 1 and August 14, you would want to be sure that this is a bird on territory and not a migrant or post-breeding wanderer.

Submitting your data

Please *enter your data onto the computer within 2 weeks of completing your survey, or, at the latest by August 28 each year.* You can correct the data as long as your region's data reviewer (your RC) has not finalized the submission. If you do need to change data at that point, please contact the RC.

Please remember that Ontario Owls receive a lot of attention but, under eBird definitions, the majority are not considered sensitive species. Due to the detailed station information, we ask that you do not submit your owl survey results to eBird.

If you need data forms, you can print them from the Owl Survey web page here:

<https://www.birdsontario.org/owl-nightjar-surveys/>

If you have any questions, please email atlas@birdsontario.org.

Thanks very much for doing owl surveys. We hope you enjoy them!

Appendix A - MP3 Resources for Owl Surveys

Owl training. The owl training MP3 files can be obtained using separate links for each MP3 file available [here](#). It includes recordings of other birds and common frogs you might hear while out owling. Included are: Great Gray Owl; Long-eared Owl; Great Horned Owl; Barred Owl; Northern Saw-whet Owl; Boreal Owl; Northern Hawk Owl; Short-eared Owl; Eastern Screech-Owl. Wilson's Snipe; American Woodcock; Ruffed Grouse; Mourning Dove; Wood Frog; Spring Peeper; and Chorus Frog. This is the same training recording used by the Ontario Owl Survey.

Appendix B – Navigating to survey stations

The Universal Transverse Mercator (UTM) grid system is the location system used for the Ontario Great Gray and Boreal Owl Survey and Ontario Atlas-3.

Finding stations using the 10-km square map

The locations of the numbered Atlas Point Count Station are shown on the Atlas 10-km square map, and the UTM coordinates of each are listed on the right side of the map. You can use a hard copy printed map to navigate to the station. Use the UTM on a GPS or other device (see below) to find the precise coordinates of the station and run the survey as close as possible to the designated coordinates.

Finding stations using downloaded Point Count locations

Coming soon when Atlas-3 point count locations are available for download.

Finding stations using the NatureCounts app

Coming soon when Atlas-3 point count locations are available on the NatureCounts app.

Using a GPS unit to determine UTM location

If you have a GPS unit, set the device to NAD83. Check all 6 digits of the Easting and all 7 digits of Northing. (If your GPS unit gives you 7 digits for Easting, ignore the initial “0”).

Using a Smart Phone

iPhone

On an iPhone you can use the built in Maps app or Compass app or you can download a mapping app such as Google Maps. iPhone defaults to latitude longitude so you will need to set your defaults to UTM.

Android Smart Phone

Unlike the iPhone, the Android system doesn’t have a default, built-in GPS coordinate utility to show you the information that the phone already has, so you have to find an Android app that can provide this functionality. See the google play store for available apps or review your options online. One good review is available at <https://www.androidauthority.com/best-gps-app-and-navigation-app-for-android-357870/>. Remember to set your default to UTM or you will need to convert your coordinates later.

Appendix C - How to stay safe while conducting owl and crepuscular surveys

Surveyors, not just birds, are important! For nocturnal surveys in high traffic areas, in remote locations, or on narrow roads, we cannot overemphasize how important it is to consider YOUR safety and that of other drivers. Please use these tips to help ensure you have a fun enjoyable and SAFE evening:

- Take a Friend, Tell another friend your survey plans and be sure to check in
- Bring a cell phone, know if you have service where you survey
- Keep your eyes on the road while driving – stop and pull over before you survey
- While driving only the passenger should handle tech (gps locations, texts, calls etc.)
- Is your car ready? Is it in good condition, is your gas tank full, does your battery charge correctly.
- Check the roads IN DAYLIGHT to ensure they are safe to drive and that people can safely pass you when you stop. Consider mud, ruts, bridges, washouts etc.
- Will others be able to see you? Check the forecast for road conditions and for visibility and avoid poor driving conditions
- Wear your reflective Safety Vest!
- Take a flashlight or headlamp and extra batteries
- If you don't like listening to your caution lights leave your headlights on but watch and ensure your alternator is charging your battery
- What else will drain your batteries? Your headlights, stereo system, cell phone, broadcast unit, seat warmers and starting the car every six minutes. You will need to choose what equipment you need and what you don't.
- If there is no snow, check for ticks and/or stay out of the tall grass
- Consider carrying the following particularly for more remote routes:
 - shovel, shovelling is far better than a long walk
 - bring your winter roadside emergency kit. If you aren't sure what goes in an emergency kit, check out [here](#) or [here](#);
 - a blanket or sleeping bag for every participant
 - bring your first aid kit, make sure you know where it is and that it is up to date
 - make sure you have a spare tire and a jack or a tire repair kit. Refresh your memory on how to use this equipment
 - and take more food and water than you think you need
- For further information on safety while atlassing [click here](#)

Taking little ones along? What a great idea! Take lots of fun snacks, bring ear protectors, dress them in light-reflective colours and ensure children remain off the road. As you will be looking up a lot (and not at your child) make sure there is another adult with you to specifically keep an eye on them. **If an owl calls - remember to take their ear protectors off so they can enjoy the moment as well. Above all else, remember that people are important too and if for any reason you are concerned for your safety or the safety of others, please stop your survey! There will always be another day and another year to collect data.**

Appendix D - Sample data form – completed

Ontario Breeding Bird Atlas – 3: Long-eared Owl Data Form

Special surveys should be collected in the field using either the NatureCounts app or the appropriate data form. Please ensure the data is submitted using the app or online at www.birdscanada.org/birdmon/onatlas

Square ID:	Atlaser Name and ID:	Assistant Name and ID:
Year: ____ Month: ____ Day: ____	Comments	

Species Codes
 LEOW - Long-eared Owl BDOW - Barred Owl BOOW - Boreal Owl GGOW - Great Gray Owl SEOW - Short-eared Owl
 NSWOW - Northern Saw-whet Owl* CONI - Common Nighthawk* EWPW - Eastern Whip-poor-will* EASO - Eastern Screech-Owl* GHOW - Great Horned Owl*

*All or part of the survey period extends beyond the safe breeding dates for these species; be cautious in the assessment of breeding evidence beyond the safe date periods.

Noise Codes: How does the ambient noise, natural (e.g., frogs) or man-made (e.g., traffic, power lines) noise impact your ability to survey.
 1: None or slight, relatively quiet, little interference with broadcast and/or listening.
 2: Moderate, some interference with broadcast and/or listening
 3: High, substantial interference with broadcast and/or listening
 4: Excessive noise, extreme interference with broadcast and/or listening.

Breeding Codes (from lowest to highest evidence):
H: Species observed in suitable nesting Habitat during its breeding season.
S: Singing male or adult producing other sounds associated with breeding (e.g., calls or drumming) in suitable nesting habitat during the species' breeding season.
P: Pair observed in suitable nesting habitat during the species' breeding season.
A: Agitated behavior or alarm calls of an adult in suitable nesting habitat during the species' breeding season.
FY: Recently fledged young (see Atlas [Breeding Evidence Codes](#) for a more complete description).

Stn #	Time (24 hr)	Species	Please identify minute by minute observations. Mark "X" if heard, "S" if seen; "XS" if both					Direction and Distance (m) to each owl when first heard					Conditions and Comments		
			1 st Min	2 nd Min	3 rd Min	4 th Min	5 th Min	Breeding Code	Direction	<200	200-500	500-1000	1000+	Traffic Count (# cars)	Noise Level (1-4)
Example 2	22:12	LEOW	X	X	X	X	X	FY	NE		X			2	1
		LEOW	X	X	X	X	X		NE		X				
		LEOW				XS			N	X				2 Juvenile LEOWs calling; adult seen and calling; BDOW hooting	
		BDOW				X		S	W			X			

Figure 2: Example of Long-eared Owl Data Form completed for the first stop of a survey (Station 2, in this case).

Other species (record any species that are uncommon or unusual to hear on diurnal point counts)											
Stn #	Species	Total Count	Breeding Evidence	Stn #	Species	Total Count	Breeding Evidence	Stn #	Species	Total Count	Breeding Evidence
2	EWPW	1	S								

Figure 3: Example of Long-eared Owl Data Form, **Other Species** completed for Station 2.