What you need to know:

Surveying Whip-poor-wills & Nightjars in The Land Between

Canadian Nightjar Survey Protocol - 2020

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The Land Between

Cottage Country's Conservation Organization

The Land Between has updated a standardized survey protocol for use in our bioregion. Edits were made by Emma Halupka. The credits for the original document (2019) are as follows:

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Photo credits: Anne C. Brigham (Common Nighthawk) and Nicholas Bertrand (Eastern Whip-poor-will).

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1. INTRODUCTION

Thank you for contributing to nightjar monitoring in Ontario and Canada! Prior to surveying, please read this protocol in its entirety and familiarize yourself with the identification of nightjar species that may be found in your area. A one-page summary of the protocol can be found in Appendix A and used as quick reference in the field.

Conducting a Nightjar Survey is easy – anyone with good hearing and a vehicle can participate!

- Each route is a series of 12 road-side stops
- Each route needs to be surveyed once per year between June 15 and July 15
- Survey the route once starting at 30 minutes before sunset

At each stop, you will listen quietly for nightjars for six minutes and record information about your survey.

2. OBJECTIVES

The data you are helping to collect will be used to expand our understanding of Common Nighthawks, Common Poorwills, and Eastern Whip-poor-wills across the country. Due to their nocturnal habits, nightjars are understudied, but there is concern about their declining populations. Common Nighthawks and Eastern Whip-poor-wills are listed as Threatened under the federal Species at Risk Act. Information on nightjar distribution, abundance, habitat associations, and population trends is critical for conservation and management efforts.

To increase our understanding of nightjar species in Canada, the Canadian Nightjar Survey Protocol is designed with four objectives in mind:

1. *Habitat associations and critical habitat mapping*: roadside citizen science data will cover a large geographic expanse and can be integrated with more locally-collected, non-roadside data to characterize nightjar habitat.
2. *Long-term population monitoring*: data collected will be compared to Breeding Bird Survey data after several years of data collection to determine whether the protocol increases the precision of population trend estimates.
3. *Distribution and abundance mapping*: data collected will help refine our understanding of the distribution and abundance of nightjars across Canada.
4. *Environmental assessment*: survey data could be used to inform environmental assessments by providing a baseline against which we can evaluate the potential impacts of development to nightjar species and their habitat

3. NIGHTJAR BIOLOGY & IDENTIFICATION

Nightjars are a family of cryptic birds that forage for flying insects at night. These beautiful birds have long, pointed wings for flight, and are highly camouflaged against the leaves and branches they roost upon during the day. Many of these species are highly migratory, spending their winters as far south as Argentina. During the summer, nightjars breed across Canada, generally laying two eggs directly on the ground with no nest.
Due to their nocturnal behaviour and cryptic appearance, nightjars are rarely seen, so it is most important to learn how to identify nightjars by sound!

3.1. Common Nighthawk (*Chordeiles minor*)

3.1.1. Biology

Common Nighthawks are found almost everywhere in Canada, except Newfoundland and the far north. These birds are one of the last birds to arrive from migration, showing up across the country in late May and early June. Common Nighthawks are generally found in open-area habitat such as grasslands, clearcuts, sandy areas, peatlands, rocky bluffs, open forests, and even urban areas. Nighthawks use large areas of space – males are thought to defend territories for mating and nesting, but forage and roost outside those territories up to several kilometres away. Common Nighthawks are listed as Threatened due to steep population declines based on existing Breeding Bird Survey data.

3.1.2. Identification

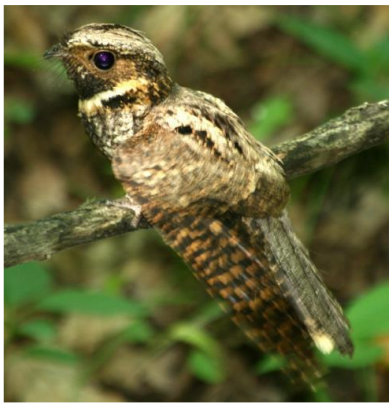
Common Nighthawks are most likely to be seen during surveys because these birds are more crepuscular than other nightjar species, meaning they are most active at dawn and dusk. Common Nighthawks become active approximately 30 minutes before sunset, and remain active until 60 or 90 minutes after sunset. Nighthawks forage for insect prey during sustained-flight, much like swallows and swifts. Their bright white wing bars are a tell-tale way to identify this species in flight.
Common Nighthawks can be identified by two different sounds. The first is a vocal “peent” or “beerb” call that is frequently made while the birds are in flight. The second is a mechanical wing-boom, made by wind rushing through the down-curved wing tips of the male at the bottom of a steep vertical dive. Wing-booms are thought to be for territorial defense and mate attraction, much like the songs of male songbirds.

3.2. Common Poorwill (*Phalaenoptilus nuttallii*)

Note: This species is not found within the Land Between, so we have removed this information from the original survey protocol.

3.3. Eastern Whip-poor-will (*Antrostomus vociferus*)

3.3.1. Biology



Eastern Whip-poor-wills are found from east-central Saskatchewan to Nova Scotia, with the majority of the population likely occurring in Ontario and Quebec. Eastern Whip-poor-wills arrive in Canada in early to mid-May, and occupy areas with a mixture of open and wooded areas. They forage in open areas and use wooded areas for perching and nesting. Eastern Whip-poor-wills are listed as Threatened also due to steep population declines.

3.3.2. Identification

Eastern Whip-poor-wills are also rarely seen, but the species is distinguished by a white ring around the base of the neck and white spots on the outer tail feathers. Eastern Whip-poor-wills are most vocal during clear nights in June when the moon is at least half full, and can repeat their characteristic “whip-poor-will” call up to 100 times without stopping! They begin calling about 30 minutes after sunset, and call for about 90 minutes each night.

3.4. Other Species of Interest

Other nocturnal and crepuscular species of conservation interest that it may be useful to document, and that you might want to learn include:

- Owls (e.g. Barred Owl, Northern Saw-whet, Long-eared Owl, Great-horned, Eastern screech-owl, and Snowy Owl).
- Yellow Rail
- American Woodcock
- Chimney Swift

3.5. Identification Resources

To practice your nightjar and nocturnal bird species identification, we recommend the following resources:

3.5.1. Online – Before You Survey

- Dendroica: an interactive website designed to help learn bird identification. Listen to recordings and look at photos of potential species.
- Xeno-canto: an online database of recordings of birds from volunteers across the world.
    - Common Nighthawk (make sure to listen to some recordings with wing-booms)
    - Eastern Whip-poor-will
- The Cornell Lab of Ornithology's Macaulay Library is the world's largest collection of wildlife sounds and videos.

3.5.2. Apps – While You Survey

- iBird (nightjars are in the Pro, Canada, Ultimate, and Plus editions)
- Audubon Birds of North America (now free!)
- The Sibley eGuide to Birds
- The Land Between has a page on iNaturalist where you can report animal observations in the region. You can find it by searching for "The Biodiversity of the Land Between Ecotone".

4. SURVEY OVERVIEW

4.1. Route

The Canadian Nightjar Survey Protocol uses unlimited radius point counts along permanent road-side survey routes so that survey data can be compared between years. The route framework is made up of permanent routes from several sources:

- Breeding Bird Survey routes (every second stop of first 23 stops)
- Routes in target habitat for Common Poorwills or Eastern Whip-poor-wills
- Existing routes from previously-established survey programs

To maintain volunteer interest, routes with no nightjars detected for two consecutive years will be removed from the pool of available routes and put back in the pool of available routes after five years of not being surveyed.

The Land Between Charity has added additional routes within our bioregion. Routes were placed in areas where we suspect there could be nightjars, based on their habitat requirements and distance from human impact. We will do our best to assign volunteers a route that is close to where they live.

4.2. Stops

Each route consists of 12 survey stops each spaced at least 1.6 km apart (there are some routes that have 10 or 11 stops if there is not enough space for 12). The starting point of your route will be named Stop 1. Subsequent stops are sequentially numbered (i.e. 2, 3, 4 etc.). It is critical that surveys be conducted at these same stops each year so that data can be compared between years. Volunteers will be provided with a route map and the coordinates of their survey stops to ensure the same stop locations are surveyed each year.

4.2.1. New Routes

Some routes may never have been surveyed before, in which case the location of the stops is at your discretion, and will require extra scouting time. You will be provided with a map of your route including satellite imagery, and you will be required to collect information on stop location (see Section 5.4). Please choose your stop locations with the following in mind:

- Stops should ideally be 1.6 km apart. Use your car odometer to measure distance.
- If your survey route road has curves, try to place stops 1.6 km apart straight-line distance. Using a GPS will help determine **straight-line distance**.
- Your safety is of first priority during nightjar surveys, so please ensure that your stops include a safe place to pull over and park.
- Avoid stop locations with excessive noise (e.g. located beside running water, barking dogs, etc.)
- It is better to add distance between stops rather than placing stops less than 1.6 km apart so that you avoid counting the same birds twice.
- Not all of your stopping points need to be on the same road. Turning onto different roads may be necessary to find a safe place to park.
- We recommend scouting your route during daylight to become familiar with the stops.

4.3. Survey

When you arrive at your stop location, remain silent for at least one minute before beginning the survey. At each survey stop, count all nightjars seen or heard for a period of SIX minutes. Counting birds and recording data should be done from a stationary position outside of your vehicle. Record birds as you hear them, rather than waiting for the end of the six-minute period to avoid data omission errors. Most importantly, be consistent. Use the same technique at each stop including how you focus your listening between nearby and distant birds. To ensure data are comparable between surveys by different volunteers, please:

- **DO NOT** use whistles, audio calls, or any method that coaxes birds to call or come closer
- **DO NOT** use a flashlight to search for reflections of bird eyes

See Section 5.3 for further details on how to record your nightjar observations.

4.4. Date

Surveys must be conducted during the nightjar breeding season between June 15 and July 15. Each route needs to be surveyed once per year. Survey within one week of the full moon (therefore, between June 27 and July 11, 2020).

Excessive wind and rain will diminish the quality of surveys. Do not complete surveys when wind speeds are Beaufort level 3 or greater (see section 5.2.1), or if there is any precipitation. If you begin a survey route and conditions deteriorate for more than 3 survey stops, we advise you to abort the survey and attempt it on another night with better conditions.

4.5. Time

Surveys **begin 30 minutes before sunset**, the time when nightjars are most active. Only one route may be surveyed per night due to these timing requirements. Sunset is considered the beginning of official civil twilight for your survey route area and can be looked up online at:

http://www.nrc-cnrc.gc.ca/eng/services/sunrise/advanced.html

To cover both the 6-minute nightjar survey and driving to your next survey stop, each stop will require about ten minutes to complete. The entire route will require a total time of approximately two hours.

5. DATA COLLECTION

The datasheet for data entry is in a separate document in this package. Please fill in each section of the datasheet according to the instructions in this section.

5.1. Survey Info

Fill in the route name, date, start time, and end time of the survey. Describe the general location and condition of the route including road condition and any safety concerns. Record the temperature at the beginning and end of your survey. Submit your name, mailing address, phone number, and email address for our records.

5.2. Stop Conditions

For each stop surveyed, record the time the survey began. We also ask that you record data on the conditions at each stop because factors such as wind and moon visibility can affect your chances of detecting a nightjar.

5.2.1. Wind

Record the wind speed using the Beaufort scale below. Do not conduct surveys during wind ≥ 3.

Code	Wind Speed	Description
0	< 1 km/h	Calm- Smoke rises vertically.
1	1-5 km/h	Light air - Smoke drifts, leaves and wind vanes are stationary.
2	6-11 km/h	Light breeze – Wind felt on exposed skin, leaves rustle, wind vanes begin to move.
3	12-19 km/h	Gentle breeze - Leaves and small twigs constantly moving.

5.2.2. Cloud Cover

Rate the amount of cloud cover at the time of your survey using the following codes:

Code	Sky	Description
0	0% cover	Clear, cloudless sky; can see stars and moon clearly.
1	< 25% cover	Mostly clear, with scattered clouds.
2	25-50% cover	Up to half the sky covered with clouds.
3	50-90% cover	Dense cloud cover, but some patches visible.
4	> 90% cover	Entire sky clouded over.

5.2.3. Moon

Enter yes or no to indicate if the moon can be seen while surveying. This is particularly important to record in deep valleys where the moon is often obstructed by the surrounding hills or mountain ridges.

5.2.4. Noise

Record the level of background noise at each stop using the following codes:

Code	Noise	Description
0	None	No effect of background noise on your ability to hear nightjars.
1	Slight	Noise slightly affects your ability to hear nightjars (e.g. distant traffic, dogs barking)
2	Medium	Noise moderately affects your ability to hear nightjars (e.g. airplane, moderate traffic).
3	Excessive	Noise seriously affects your ability to hear nightjars (e.g. continuous traffic nearby, construction noise, frog chorus).

5.2.5. Cars

Count the number of cars that pass on the road during your survey.

5.3. Nightjar Detections

5.3.1.Nightjars

Each line on the data sheet represents an individual bird's detection history (see example on next page). Use a new line for each new bird detected at a stop. Do not record any nightjar detection data if no nightjars or owls were heard at any given stop. If you cannot accurately count the number of individuals by sight or by concurrent calls, make a note in the "comments" column of your data sheet. Use the following nightjar codes:

- CONI = Common Nighthawk
- EWPW = Eastern Whip-poor-will

5.3.2. Distance and Direction

Recording the location of particular observations may help us learn more about the specifics of nightjar habitat requirements. Please estimate the distance and direction to your first detection of:

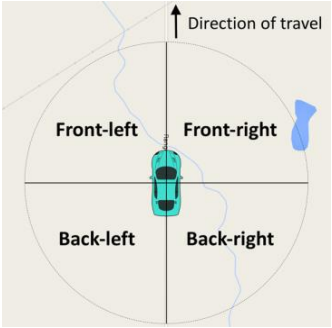
- Eastern Whip-poor-wills
- Common Nighthawks performing repeated wing-booming in the same location (3 wing-booms).

You do not need to estimate distance and direction for Common Nighthawks that are not performing repeated wing-booming.

Estimate distance as one of the following:

- near (< 100 m)
- far (> 100 m)

Estimate direction using cardinal direction (i.e., north, east, south, west). If you are unsure of cardinal direction, describe direction relative to your vehicle and the road:



5.3.3. Detection Type

The survey period is broken into 6 one-minute intervals on the data sheet. **For each bird heard or seen during each one-minute interval**, indicate the highest ranked type.

1. **Wing-boom (W)**: If the bird performed a territorial wing-boom in that one-minute interval (Common Nighthawks only).
2. **Call (C)**: If you heard the bird call during that one-minute interval.
3. **Visual (V)**: If you saw the bird, but did not hear it during that one-minute interval.
4. **Not detected (N)**: If you did not detect the bird during that one-minute interval.

Sample data entry: The observer detected one Common Nighthawk calling during the first two minutes of survey at Stop 1, and performing wing-booms in minute 3. The observer then detected a second Common Nighthawk calling at Stop 1 during the 3rd minute and 4th minute of the survey, so began a new row on the data sheet for this bird. This observer used their best judgment in deciding these were two individual Common Nighthawks, and not the same bird that moved after initial detection. At stop 2, the observer did not detect any birds until the survey ended, so they did not record any data. At Stop 3, an Eastern Whip-poor-will was heard calling less than 100 m to the south. The observer also detected one Common Nighthawk calling and performing several wing booms per minute for the entire 6 minutes several hundred meters to the northeast. At Stop 4, the observer saw a Common Nighthawk fly over in minute 2, and heard a Whip-poor-will start calling in the 6th minute of the survey.

Stop (1-12)	Species	Time Interval						Distance (circle)	Cardinal Direction
		1	2	3	4	5	6		
1	CONI	C	C	W	N	N	N	<100 m >100 m	N
1	CONI	N	N	C	C	N	N	<100 m >100 m	SW
2	N/A	N	N	N	N	N	N	<100 m >100 m	
3	EWPW	N	C	C	C	C	N	<100 m >100 m	S
3	CONI	W	W	W	W	W	W	<100 m >100 m	NE
4	CONI	N	V	N	N	N	N	<100 m >100 m	
4	EWPW	N	N	N	N	N	C	<100 m >100 m	

5.4. Stop Locations

This section of the datasheet should **only be filled out if your route has never been surveyed before or if you wish to recommend a stop location amendment**.

Stop coordinates must be recorded and submitted for routes to be surveyed at the same stops in subsequent years. Ideally, location coordinates should be submitted as latitude and longitude in decimal degrees (NOT degrees minutes seconds) to six digits (e.g., 49.884128 N, 119.496301 W). There are several ways to obtain the coordinates for your new stop locations:

1. Use a handheld GPS and take waypoints at each of your stops.
2. Drop a "pin" using Google Maps (if you have cell service at your route location).
3. There are many excellent GPS apps available for smartphones. If you have an iPhone, Android, or BlackBerry, you can turn it into a handheld GPS. Here are a few app options:
    - MotionX-GPS for iPhone ($1.99)
    - Free GPS for iPhone (Free)
    - GPS Test for Android (Free)
    - GPS Maps Location Finder for BlackBerry (Free)
4. Locate coordinates after survey completion in Google Earth. If you choose this option, we recommend marking stops on a printed map as you survey and using your car's odometer to keep track of how far apart your stops are.
5. If you are unable to do any of the above methods, mark the locations on your paper map as best you can, and our staff will try to find the coordinates for you.

6. EQUIPMENT

6.1. Essential

- ❑ Vehicle
- ❑ Protocol
- ❑ Datasheets (blank)
- ❑ Map of route and stops
- ❑ Flashlight (ideally headlamp type)
- ❑ Watch or other device with a timer (e.g., phone)
- ❑ Several pencils/pens

6.2. Recommended

- ❏ An assistant/driver
- ❏ GPS and/or phone with GPS app
- ❏ Thermometer for recording temperature at the beginning and end of your survey
- ❏ Road map for getting to your route
- ❏ Compass (for determining cardinal direction to birds)
- ❏ Clipboard
- ❏ Spare batteries (for flashlight or GPS)
- ❏ Insect repellent and/or mosquito-repellent clothing
- ❏ Safety vest or other reflective clothing (strongly recommended).
- ❏ Wear long pants and closed-toed shoes.

7. SAFETY

Your safety is most important, so please ensure that you are conscious of your safety when conducting a survey. Please take the follow points into consideration:

- We strongly recommend conducting surveys in a team of two (or more)
- If surveying alone, make sure someone knows where your survey route is and what time you will return
- Park your vehicle well off the road during survey stops
- Stand off the road surface when conducting surveys
- **Leave parking lights on** throughout the duration of a count. We recommend leaving your hazard lights on as well.
- Wear a reflective vest or use a headlamp so that other drivers are aware of your location
- Conduct the survey near the road to avoid trespassing on private property
- Check your clothing and skin for ticks when you get home to prevent the transmission of Lyme disease and other tick-borne illnesses
- Be aware of wild animals that may be active at night (e.g. coyotes and bears). Read the safety document in this package to learn more about bear encounters and how to identify noxious plants.

8. DATA SUBMISSION

If you were assigned **an existing WildResearch route**, you may enter your data using your account on the WildResearch Nightjar Atlas by:

1. Login using your username and password
2. Go to "Enter My Survey Data"
3. Enter your Survey Info and submit
4. Click on Stop 1 to enter your Stop Conditions data for Stop 1 and submit
5. Enter any nightjar observations for Stop 1
6. Repeat steps 4 and 5 for each subsequent stop.

If you have a new route set by The Land Between Charity, or are unable to enter your own data, after your survey date you may:

a. Submit your forms and map in hard copy to our office at 6712 Gelert Rd (the portable outside the Haliburton fish hatchery).
b. Scan/ photograph the completed sheets and email them to **CitizenScienceTLB@gmail.com** or,
c. You can send them by mail to:

The Land Between Charity, Box 1368
Haliburton, ON, K0M 1S0

For clarification about the protocols, how to submit data, or anything else in this document, please call the Land Between office at (705) 457-1222

APPENDIX : QUICK-REFERENCE PROTOCOL SUMMARY

Quick reference for use in the field. Please use once you are familiar with the full survey protocol.

Survey: After parking, wait 1 minute. When ready to record, listen quietly for a period of 6 minutes.

Route: Each route consists of 10 to 12 survey stops spaced at least 1.6 km apart and numbered consecutively. If you have a new route, you must set these stops yourself and record GPS coordinates if possible (recommended to do this ahead of time, in the daylight). Please prioritize safety when deciding on stop locations.

Date: Survey once between June 27 and July 11, 2020. Do not survey if there is a strong wind or rain is stronger than a light drizzle.

Time: Begin at 30 minutes before sunset (civil twilight for your area). It will take about 10 mins to survey one stop and travel to the next, for a total survey time of 2 hours.

Data collection – Stop Conditions: At each survey, record the time your survey began, wind strength, cloud cover, moon visibility (Y/N), level of background noise, and the # of cars that pass.

Data collection – Nightjar Detections: Each line on the data sheet represents an individual bird's detection history.

- You do not need to fill this in if you did not detect any nightjars at your stop.
- The survey period is broken into six one-minute intervals on the data sheet.
- For each bird detected in each one-minute interval, record the code for the highest ranked detection type you observed:
    1. **W** (Wing-boom; Common Nighthawks only)
    2. **C** (Call)
    3. **V** (Visual)
    4. **N** (Not detected)
- Record the distance (< 100 m or > 100 m) and direction to your first detection of
    - Eastern Whip-poor-wills
    - Repeat wing-booms of Common Nighthawk (i.e., 3 wing-booms in the same location)

Data collection – Stop Locations: Record stop coordinates as latitude and longitude in decimal degrees if your route has no pre-established stop locations or to suggest a route amendment.

Essential Equipment Checklist:

- Data sheets, Survey protocol, & Route map
- Flashlight
- Stopwatch/timer
- Pens/pencils
- GPS or map of route to mark new stops on (new routes only)
- Location of stops (previously surveyed routes only)