National Chimney Swift Roost Survey Protocol

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Abstract

The Chimney Swift (*Chaetura pelagica*) is a bird species listed as threatened in Canada under the *Species at Risk Act*. In Canada, it breeds in Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, and Nova Scotia. It is rarely observed in Prince Edward Island and Newfoundland during the breeding season. The Chimney Swift mainly uses chimneys in urban and suburban areas as nesting sites and roosts. The gathering of a large number of swifts in flight shortly before they enter their roost allows the birds to be counted at a given site within a relatively short period of time. The present document describes a protocol specifically designed to survey Chimney Swift at roost sites. The implementation of surveys across Canada using a standardized protocol will help to more accurately assess population trends and better guide conservation efforts for this species.

Résumé

Le Martinet ramoneur (*Chaetura pelagica*) est une espèce d'oiseau désignée menacée au Canada en vertu de la *Loi sur les espèces en péril*. Au Canada, il niche en Saskatchewan, au Manitoba, en Ontario, au Québec, au Nouveau-Brunswick, en Nouvelle-Écosse. Il est rarement vu en période de nidification à l'Île-du-Prince-Édouard et à Terre-Neuve. Le Martinet ramoneur utilise principalement des cheminées en milieux urbains et périurbains comme sites de nidification et dortoirs. Les rassemblements aériens d'un grand nombre de martinets peu avant leur entrée aux dortoirs fait en sorte que les oiseaux peuvent y être dénombrés au même endroit dans une période de temps relativement courte. Le présent document décrit un protocole spécifiquement élaboré pour réaliser des inventaires de Martinet ramoneur aux dortoirs. La réalisation de ces décomptes à travers le Canada selon une méthode standardisée permettra d'évaluer plus précisément la tendance de population au pays et de mieux guider les efforts de conservation de l'espèce.

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We would also like to thank all the participants in the Chimney Swift monitoring efforts for the past several years, as well as those who will be participating in the future.

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1 Introduction

Similar in appearance to a swallow, the Chimney Swift (*Chaetura pelagica*) is a small, dark-grey bird with a cigar-shaped body, long, narrow, pointed wings, and a short tail. Its flight is fast and erratic with frequent changes of direction. It breeds mainly in central and eastern North America, from southern Canada to Texas and Florida, and more recently in California (Steeves et al., 2014). It winters in South America, mainly in the Amazon basin and in adjacent areas of Chile and Peru (Steeves et al., 2014). Nearly a quarter of the Chimney Swift's breeding range is located in Canada, where it nests in east-central Saskatchewan, southern and central Manitoba, southern Ontario, southern Quebec, New Brunswick, Nova Scotia and possibly Prince Edward Island and southwestern Newfoundland (COSEWIC, 2018; Figure 1). The Canadian population was previously estimated at about 12,000 breeding individuals (COSEWIC, 2007). However, in light of new knowledge acquired from roost monitoring, this number may be higher. Indeed, during a single evening, a survey carried out simultaneously across Canada on June 3, 2019 tallied 19,214 individuals (CWS, unpublished data). During that evening, not all known roosts were surveyed, and part of any given population had probably already entered the nesting sites when the survey began and were thus not counted. Of course, there may also be some undocumented roosting sites as well. A more recent estimate of the population suggests a range between 10,000 and 70,000 individuals (COSEWIC, 2018).

The Chimney Swift is designated as a threatened species in Canada and is protected by federal legislation, specifically the *Species at Risk Act* (SARA) and the *Migratory Birds Convention Act, 1994*. The main threats affecting the species are considered to be a decline or a change in populations of insect prey, the demolition or modification of chimneys, chimney sweeping or the use of chimneys during the nesting season, and logging and wood harvesting in both the breeding and wintering ranges (COSEWIC, 2018).

Prior to European settlement of North America, the species was associated with old-growth forests, where it used large-diameter hollow trees to nest and roost (COSEWIC, 2018). Such trees have become rare following the clearing resulting from colonization, and the Chimney Swift currently mainly uses chimneys in urban and suburban areas as nesting and roosting sites (COSEWIC, 2018). There is only one pair per nesting site, but roosts may be used by up to hundreds or even thousands of individuals that gather at the end of the day to spend the night (Steeves et al., 2014). Roosts are used by migrating swifts as well as by non-breeding individuals during the summer period (Steeves et al., 2014). Occasionally, a structure may be used simultaneously as a nesting and communal roosting site during the same year (Steeves et al., 2014). In Quebec, five chimneys have been found that served both functions during the same year (CWS, unpublished data).

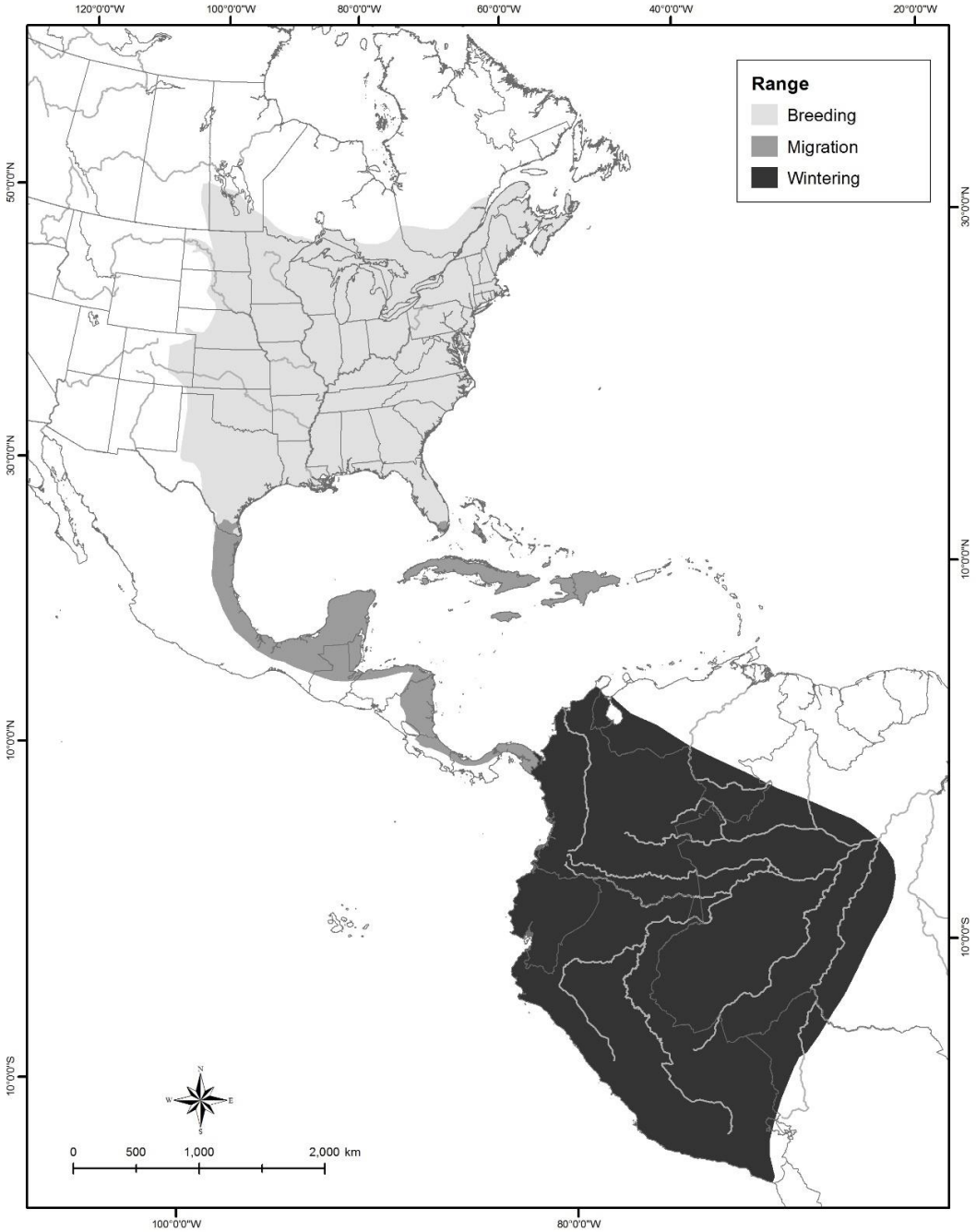

Figure 1. Distribution of the Chimney Swift (modified from Birdlife International, 2017).

When it is not directly occupied with various tasks related to nest building, egg laying, incubation and caring for the young, the Chimney Swift spends much of its days foraging for insects on the wing to feed itself or its chicks at the nesting site.

The large flocks of swifts that gather just before they enter the roosts make it easy to identify roost sites, and the birds can be counted at the same place and in a relatively short time. At a roost, swifts can be observed in the evening swirling around the chimney, often chittering for several minutes, and then vanishing inside just after sunset. Swifts using a nesting site are generally more discreet and may enter and leave at any time of day, their comings and goings being more frequent during the period of feeding young (Gauthier et al., 2007).

The North American Breeding Bird Survey (BBS) is the main program for monitoring bird populations of most species at the continental scale (Sauer et al., 1997). Established in 1966, it is carried out by observers on roadside survey routes, each route consisting of 50 stops spaced 0.8 km apart. The BBS is not entirely adequate for estimating Chimney Swift population trends since the BBS routes tend to avoid cities where the majority of Chimney swifts nest and roost. A species-specific monitoring survey is required to better estimate population trends for Chimney Swift.

In 1998, the Quebec Region of the Canadian Wildlife Service (CWS) organized a Quebec Chimney Swift Survey Program in order to acquire better knowledge about this species. The collection of field data is carried out by volunteer observers and CWS employees in order to identify nesting and roosting sites and to count the number of swifts present between late May and late August (Gauthier et al., 2007). This program made it possible, first of all, to identify sites used by the species, and secondly, to determine the chronology of the species' presence and its range in Quebec. The program was reviewed and reorganized in 2010 and 2013 in order to optimize its efficiency (Rioux et al., 2010; Rioux, 2013).

In 2004, Nature London launched the SwiftWatch program with the goal of monitoring the Chimney Swift during the fall migration at known roosts located in the City of London, Ontario. During subsequent years, Nature London expanded the program to include roost monitoring in the spring, summer, and fall, and in 2009, Nature London collaborated with Bird Studies Canada (now Birds Canada) to review and improve the monitoring protocol used. In 2010, Bird Studies Canada launched the citizen science program Ontario SwiftWatch in order to coordinate Chimney Swift monitoring efforts at the provincial scale, and then expanded the program to the Maritime provinces in 2011.

Since 2007, the Manitoba Chimney Swift Initiative, an association dedicated to Chimney Swift conservation, has been coordinating the monitoring of this species by observers at nesting and roosting sites in southern Manitoba between mid-May and early September. There is no survey in Saskatchewan as no roost have been identified to date in that province.

In 2013, the Quebec Region of the CWS, Bird Studies Canada and the Manitoba Chimney Swift Initiative organized a national Chimney Swift roost monitoring program. The monitoring consists of simultaneous surveys at known roosts used by the species in Manitoba, Ontario, Quebec, New Brunswick and Nova Scotia, on four fixed dates in late May and early June.

This document describes the survey method specifically developed for the monitoring of Chimney Swift roosts in Canada. The survey protocol was developed based on the experience acquired over the years by the various above-mentioned parties.

2 Objectives

The goal of the national Chimney Swift roost survey protocol is to monitor the number of Chimney swifts using roosts in Canada, and to use that information to track population trends and guide species conservation efforts. The implementation of this protocol will facilitate the standardization of Chimney Swift surveys across Canada.

The objectives of the national Chimney Swift roost survey protocol are as follows:

1. locate Chimney Swift roosts;
2. count swifts using the roosts at the local, regional and national scale;
3. identify threats to roosts; and
4. characterize the roosts.

3 Use of chimneys by the Chimney Swift

3.1 Roosting vs nesting sites

By observing the behaviour of swifts around a chimney, and especially the number of birds that use it, it is possible to determine whether the chimney is being used as a roosting or nesting site. When a chimney is used as a communal roost, many swifts can be observed in the evening, swirling around the chimney often chittering and then vanishing inside shortly after sunset. In fair weather, the birds leave the chimney early in the morning (before sunrise) and do not return until evening. In cold or rainy weather, they may leave later or sometimes even remain in their shelter all day. If weather conditions over the course of the day are adverse, the birds may return to the chimney earlier than usual.

A chimney used for nesting can accommodate only one nest. Nesting birds are quite discreet and are often silent when approaching and entering the chimney. Occasionally, a pair may be assisted by one or two individuals for egg incubation and feeding of the young (Steeves et al., 2014). A chimney that contains a nest can thus be used by two to four adult swifts. The birds enter and leave at any time of day and their comings and goings are more frequent during the period of feeding young (intervals of entry to the chimney of 1-120 minutes; Stewart and Stewart, 2010; Stewart and Stewart, 2013; Steeves et al., 2014). Paired birds and their helpers generally roost in their nesting chimney while some individuals roost communally (Steeves et al., 2014).

As pointed out above, the same chimney may be used as both a nesting and communal roosting site, although this is not common. The use of a chimney may also change during the same season: a chimney may be used first as a roost in the spring, then as a nesting site, and again as a roost by many birds after the nesting period is over.

3.2 Seasonal use of roosts

During migration, swifts use chimneys as roosts along their migratory route (Steeves et al., 2014). Most Chimney swifts arrive in Canada between late April and mid-May, depending on the

latitude of a given site. The first birds arrive in southern Ontario toward the end of April or the beginning of May, and those headed for higher latitudes such as northern Ontario and Manitoba arrive around mid-May (Steeves et al., 2014; eBird 2021). Most swifts arrive in Quebec during the last two weeks of May (Gauthier et al., 2007), although the first individuals are seen beginning in late April and early May (eBird, 2021). In Nova Scotia and New Brunswick, swifts arrive during the first two weeks of May (Steeves et al., 2014; eBird 2021).

As the birds arrive from their migration in the spring, large flocks of swifts can be observed at the roosts. However, not all the birds present early in the season will nest in the immediate area of these roosts, since some will continue their migration to other regions (Gauthier et al., 2007). Once the nesting birds have dispersed, some roosts will continue to be used by non-breeding individuals (Steeves et al., 2014). The number of birds at a roost will therefore typically decrease during the nesting period, and then gradually increase during the summer season when fledglings that have left the nest and adults that have finished breeding or failed breeders will use the roosts (Gauthier et al., 2007), as well as the birds that have already begun their southward migration.

4 Roost survey method

This protocol is aimed at anyone who plans to carry out surveys of Chimney Swift roosts in the species' Canadian range.

4.1 Survey site selection

Since chimneys are the main type of structure used as roosts, this protocol deals with surveys conducted at this type of structure. The species typically uses traditional masonry chimneys (made of bricks, clay tiles, concrete blocks or stones) that are generally found on old religious buildings (churches, church rectories, convents, schools) and commercial and residential buildings located in neighbourhoods built before 1960 (Gauthier et al., 2007). Some chimneys used by the species may also be covered in siding. The chimneys used as roosts are generally larger than those used only for nesting. Chimneys that are closed (by a screen, spark arrestor or chimney hat) or that have a metal lining are obviously not suitable for the Chimney Swift (COSEWIC, 2018). When a chimney has more than one flue and the opening of one of them is closed, the chimney might at first not seem suitable for the Chimney Swift, but the species could nonetheless use an adjacent flue whose opening is not closed.

4.1.1 Known sites

Chimney Swift surveys have been carried out for many years at a number of roosts in Canada by various monitoring programs targeting this species: since 1998 in Quebec, since 2004 in Ontario, since 2007 in Manitoba, and since 2011 in New Brunswick and Nova Scotia. Every year, newly discovered roosts are added to the existing list while others are deleted owing to closure or demolition. It is therefore recommended to inquire about the status and location of these roosts from the coordinator of the program targeting the region of interest (see Appendix 1) during the planning of roost surveys. To ensure adequate coverage of all roosts, particular sites are usually assigned to a participant or group of participants in April. The surveys can therefore be carried

out at sites where the presence of the species has been established in the past or at new sites that appear to be suitable for the species.

4.1.2 New sites

Searches for new sites to survey are carried out by walking, bicycling or driving around old residential or industrial neighbourhoods to look for chimneys that may be suitable for the Chimney Swift (see *4.1 Survey site selection*). Such searches, if carried out around sunset, can make it possible to locate flocks of swifts, a sure sign of the presence of a roost nearby. A newly discovered roost must be characterized using the *Data collection sheet for roost characterization* provided in Appendix 2.

4.2 Observers

Observers are recruited by the coordinator of each province (Appendix 1). Although a survey can be carried out by a single person, it may be practical to have two observers for efficiency and safety reasons. To ensure the presence of observers at a site during each survey evening, it is advantageous to be able to rely on a team of observers. The team members can divide up the survey evenings among themselves or have a replacement if an observer is not available. An observer who is alone at a survey site should inform a contact person (spouse, friend, relative or other) of the survey plan (place, approximate time of return) and should, if possible, have a cell phone in the event of an emergency.

4.3 Timing and frequency of surveys

Given the fact that Chimney Swifts have been known to travel a distance of 137 km between two roosts in a single day during migration (Calhoun, 1938) and that, in Quebec, the mean distance between neighbouring roosts is 36.6 ± 55.8 km (SD, n=38), an interval of one day between surveys conducted at nearby roosts could lead to double counting (Rioux et al., 2010). In light of this information, Chimney Swift roost surveys must be conducted simultaneously.

Surveys occur on four fixed dates in the spring separated by four-day intervals. During consultations held in 2010 with participants in the Quebec Chimney Swift survey program, they expressed their preference for not holding the survey on Friday and Saturday evenings. Consequently, in order to ensure better participation, it was decided to choose the last Sunday in May as a reference day. The second survey evening therefore takes place on the last Sunday in May, the first survey takes place four evenings before, then the third and fourth surveys take place, respectively, four and eight evenings after this Sunday. For example, in 2019, the last Sunday in May was May 26, and the survey dates were May 22, May 26, May 30 and June 3. However, if the last Sunday in May falls on May 31 (as was the case in 2015), the second visit would take place on the second-last Sunday in May, in order to avoid conducting the surveys too late into June when the nesting period may have already started at certain locations. A list of past and future survey dates is provided in Appendix 3. Since the surveys are carried out on fixed dates, they take place even in the presence of light rain but should not be conducted when there is a thunderstorm.

The spring migration period was chosen as a survey period rather than the fall migration period with the goal of counting only the adults. In addition, the use of roosts by swifts takes place during a narrower time window in the spring, whereas the gatherings are less synchronized during the postnuptial period since the pairs may have finished breeding at different times during the season (Rioux, 2013).

In good weather, swifts gather at a roost shortly before sunset (Gauthier et al., 2007). Under such conditions, the survey of a roost must therefore begin 30 minutes before sunset, but when cloud cover is > 75%, the survey must start 45 minutes before sunset. The survey ends 30 minutes after sunset. Since sunset times vary according to each locality, it is important that each observer has accurate information concerning sunset times for the locality surveyed (see Appendix 4).

The observer should plan on arriving at the survey site 10-15 minutes before the actual survey start time to allow enough time to find a proper viewpoint of the chimney and to record data on site information and weather conditions (see section below).

4.4 Survey procedure

The survey of a chimney being used as a Chimney Swift roost involves counting the number of swifts that enter the structure to spend the night there. Generally, swifts gather at a roost as follows: a few swifts begin to gather around the roost and their numbers gradually increase. The swifts circle above the roost for several minutes, then a few individuals begin to enter (one at a time or in small groups). Other birds then dive into the chimney in larger numbers within a short period of time. Once the great majority of birds have entered, a few others may join them, but at a much slower rate.

Upon arrival at the survey site, the observer must take up position at a safe location (see Appendix 5) while being at an appropriate distance to have an overview of the chimney to be surveyed. The location should ideally allow the observer to see two sides of the chimney, which facilitates bird counting, while avoiding counting those that veer away without entering. When a chimney is located on private property, the observer should conduct the survey from a public place, unless permission to access the property has been granted by the owner. The location of the observer should not interfere with the passage of pedestrians, cyclists or vehicles. The chosen location should ideally be safe for the observer and in a quiet location where he/she will not likely be disturbed during the survey.

Once in position, the observer must record the following information on the *Data collection sheet for Chimney Swift roost survey* provided in Appendix 6 (data for all four survey nights are recorded on a single sheet). On the first survey night, the observer writes down his/her name and contact information, as well as the name and coordinates of the site. On all survey nights, the observer records the date of the survey, the survey start and end times, and the current weather conditions (just before the start of the survey). Once the survey has started, the time at which the first bird makes its entrance should be noted on the data sheet.

It is important to count only the birds that enter the chimney and not the birds seen in flight or those that dive in the direction of the chimney without entering it. When many birds enter rapidly

at the same time, it is more effective to count them by groups of 5, 10 or 20, rather than trying to count each individual. It is possible that some birds may leave the chimney again after entering; the number of these birds must be subtracted from the total number of birds that entered. The observer thus keeps a tally on the data sheet of the number of swifts entering and exiting the chimney during the survey and then records at the end of the survey the net number of swifts that entered the chimney. The counting method used (see the inset below for more information) must also be noted. Shortly after sunset the rate at which the birds enter the chimney typically decreases; at this time the observer should start writing down the time at which swifts enter the chimney since the time at which the last bird entered must be recorded on the data sheet.

It is possible that a small number of birds may continue to enter beyond 30 minutes after sunset, but in order to ensure standardization of the survey, it has been decided that all observers should stop the survey at this time since by this point it is usually too dark to easily see other birds entering the chimney.

Any disturbances that occur during the survey and that could affect the swifts' use of the chimney (e.g., presence of a predator nearby, renovation work on the building to which the chimney is attached) must be recorded on the reverse side of the data sheet. The observer must also note any apparent changes made to the chimney since the last survey.

When a building has several chimneys used by swifts roosting communally, each chimney must be considered as a separate site and a survey must therefore be conducted for each chimney and not for all the chimneys together, with a separate data sheet filled out for each chimney.

Appendix 7 provides a summarized version of the above survey procedure and can be printed to bring to the surveys as a reminder of how to proceed.

Counting methods and the use of filming devices

When the number of swifts at a site is possibly greater than 100 and many individuals enter the chimney in rapid succession, it may prove difficult to count them accurately. It can therefore be useful to film the entrance of the swifts. There are thus three options for reporting the net number of swifts that entered the chimney:

(1) Visual count throughout the full length of the survey (no filming device involved).
(2) Count from a video recording of the full length of the survey; if you wish to record the entire survey period, it will be necessary to use a camera, ideally equipped with large memory storage capacity and a night vision option. A more accurate count can be obtained by viewing the recording later in slow motion.
(3) Part of the total count is from a visual count during the survey and the remaining part is from counting birds on recorded portions of the survey; in this case other types of devices (e.g., a cell phone) can be used to film only the peak period of bird entry. Caution must be taken to not count the same birds twice (i.e., visually and also in a video recorded simultaneously).

The observer should specify on the *Data collection sheet for Chimney Swift roost survey* which of the three methods was used.

4.5 Data management

It is recommended to make copies of the data collection sheets after each survey (photocopy, scan or photograph) and to keep them in a different place from where the original sheets are kept. These copies can be used to replace the original sheets in the event that they are lost or damaged. If necessary, a data sheet in electronic format can be provided by the coordinator of the monitoring program of the region concerned (see Appendix 1). The data sheets (the original paper forms or scanned copies) should be sent to the local monitoring program promptly after the last survey is conducted.

Observers are also encouraged to report sightings of swifts made otherwise than by the use of this protocol. Incidental sightings of swifts using a structure (chimneys, barns, wells, hollow trees, etc.) are important since they can help identify new roosting or nesting sites. For each incidental sighting, the observer should record the date, the time, the street address of the site, the number of swifts observed and comments on the sighting. This information should be forwarded to the coordinator of the monitoring program for your region.

Thank you for your contribution to the Chimney Swift monitoring program!

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Appendix 1: Chimney Swift monitoring programs in Canada

Manitoba Chimney Swift Initiative (MCSI)
Nature Manitoba
401 - 63 Albert Street
Winnipeg, MB R3B 1G4
Telephone: 204-943-9029
E-mail: mbchimneyswift@gmail.com
https://www.mbchimneyswift.com/

Ontario SwiftWatch
Birds Canada
P.O. Box 160, 115 Front Street
Port Rowan, ON N0E 1M0
Telephone: 519-586-3531
Toll-free: 1-888-448-2473 ext. 123
E-mail: ontarioswiftwatch@birdscanada.org
https://www.birdscanada.org/

Quebec Chimney Swift Roost Survey
Canadian Wildlife Service, Environment and Climate Change Canada
801 – 1550, avenue d'Estimauville
Québec, QC G1J 0C3
Telephone: 418-648-4078
Toll-free: 1-800-668-6767
E-mail: ec.enviroinfo.ec@canada.ca

Maritimes SwiftWatch
Birds Canada
P.O. Box 6227, 17 Waterfowl Lane
Sackville, NB E4L 1G6
Telephone: 506-364-5089
E-mail: marswifts@birdscanada.org
https://www.birdscanada.org/

Appendix 2: Data collection sheet for roost characterization (for new site only)

Date (dd/mm/yy): _____ **Site ID#**_____ (as provided by coordinator)

Name and address of the building containing the chimney

_____

Name Number Street City/Town Province GPS coordinates (if possible)

How many chimneys does this building have? _____ If the building has more than one chimney, please provide a brief description of the chimney roost (e.g. shape, colour) and of its location on the building (when facing the main entrance of the building: front, back, right side or left side):

Type of building (check one option only)

☐ House
☐ Low-rise residential building (≤ 5 floors)
☐ High-rise residential building (≥ 6 floors)
☐ Religious
☐ School
☐ Hospital
☐ Commercial building
☐ Factory/warehouse
☐ Other (specify):

Habitat around the chimney (250-m radius)

☐ Residential
☐ Rural
☐ Regional facility/school grounds
☐ Industrial
☐ Commercial
☐ Downtown
☐ Other (specify):

Chimney material (exterior)

☐ Brick
☐ Concrete block
☐ Cement
☐ Stone
☐ Indeterminate
☐ Other (specify):

Estimated number of open flues (there may be more than one flue per chimney):

Flue material (interior)

☐ Clay tile
☐ Metal
☐ Unknown or other (specify):

Chimney shape and size (estimate)

☐ If round → Diameter (cm):
☐ If square → Width (cm):
☐ If rectangular → Width (cm): Length (cm):

NOTE: Measurements can sometimes be estimated by counting the number of bricks. The standard sizes of a brick are as follows: 20 cm x 9 cm x 6 cm (length x width x height)

Estimated chimney height

(_____ X 3 m) + _____ m = _____ m
(# of storeys in the building) (approx. height of one storey) (height above roof line) **(total height)**

Location of the chimney (check one option only)

☐ on an outside wall
☐ internal chimney

Photos (write file numbers): Include at least one photo showing an overview of the building on which the chimney can be seen and at least one photo showing a close-up of the chimney, with two sides visible

Comments:

Appendix 3: National Chimney Swift Roost Survey dates since 2013

Year	Survey 1 Wednesday	Survey 2 Sunday	Survey 3 Thursday	Survey 4 Monday
2013	22 May	26 May	30 May	3 June
2014	21 May	25 May	29 May	2 June
2015	20 May	24 May	28 May	1 June
2016	25 May	29 May	2 June	6 June
2017	24 May	28 May	1 June	5 June
2018	23 May	27 May	31 May	4 June
2019	22 May	26 May	30 May	3 June
2020	20 May	24 May	28 May	1 June
2021	26 May	30 May	3 June	7 June
2022	25 May	29 May	2 June	6 June
2023	24 May	28 May	1 June	5 June
2024	22 May	26 May	30 May	3 June
2025	21 May	25 May	29 May	2 June
2026	20 May	24 May	28 May	1 June
2027	26 May	30 May	3 June	7 June
2028	24 May	28 May	1 June	5 June
2029	23 May	27 May	31 May	4 June
2030	22 May	26 May	30 May	3 June
2031	21 May	25 May	29 May	2 June

Appendix 4: Practical information

Field materials and equipment

- Clipboard
- Notebook
- Pencils
- Data sheets
- Copy of the survey protocol
- Flashlight or headlamp (optional)
- Digital camera
- Video camera and tripod (optional; bring extra batteries)
- Watch
- Thermometer
- Folding chair (optional)
- Insect repellant (in some regions)
- Umbrella
- Cell phone in the event of an emergency
- Dress for the weather

Weather forecast and sunset times

- https://www.theweathernetwork.com/ca
- https://weather.gc.ca/canada_e.html
- https://www.nrc-cnrc.gc.ca/eng/services/sunrise/advanced.html

Information on the Chimney Swift

- https://species-registry.canada.ca/index-en.html#/species/951-650

Appendix 5: Health and safety

The following are a few tips for observers in order to ensure their health and safety during a Chimney Swift roost survey.

- If the survey site is located in an unfamiliar neighbourhood, check a map before the survey and locate the neighbourhood on the map in order to familiarize yourself with the area.
- If possible, arrange to be accompanied by another person to conduct the survey.
- If you are alone at a survey site, inform a contact person (spouse, friend, relative or other) of the survey plan (place, approximate time of return) and if possible, have a cell phone in the event of emergency.
- Choose a location to observe the roost that is safe and that does not impede the passage of pedestrians, cyclists or vehicles.
- If you conduct a survey at a site where there is a high risk of mosquito or tick bites, wear light-coloured, long-sleeved shirts and long pants and/or use a DEET-based insect repellant to reduce the risks of contracting West Nile virus or Lyme disease.
- If, for any reason, you do not feel safe during the survey, stop the survey and leave the site immediately.

Appendix 6: Data collection sheet for Chimney Swift roost survey

Site ID #_____ (as provided by coordinator)

Main observer:

_____

Last name First name Address City/Town Province Postal code

_____

Telephone number E-mail

Other observer(s):_____

Name and address of the building where the roost is located:

_____

Name Number Street City/Town Province GPS coordinates (if possible)

Date (dd/mm/yy)	**Survey start time*** (hh:mm)	**Survey end time**** (hh:mm)	**Temp ºC**	**Wind speed** (0-7; see over)	**Rain** (0-4; see over)	**Cloud cover** (0-5; see over)	**Entry time of first bird** (hh:mm)	**Entry time of last bird** (hh:mm)	**Net number of swifts entering chimney**	**Counting method** **1** visual **2** video **3** mix of visual + video	**Comments**

You can use the space below to keep a tally of the swifts entering and existing the chimney during each of the four surveys:

*** 30 min before sunset when cloud cover = 1-3 or 45 min before sunset when cloud cover = 4**

**** 30 min after sunset**

See over

Appendix 6: Data collection sheet for Chimney Swift roost survey (reverse side)

To be completed only if disturbances occur during a survey or if changes have been made to the chimney since the last survey.

Disturbances (check the appropriate box or boxes):

☐ Presence of a predator. Details: _____ Date(s): _____
☐ Chimney in use (visible smoke). Details: _____ Date(s): _____
☐ Scaffolding near the chimney. Date(s): _____
☐ Work on the roof. Date(s): _____
☐ Other (specify): _____ Date(s): _____

Change(s) made to the chimney since the last survey (check the appropriate box or boxes and enter the date on which the change was noted):

☐ The building no longer has a chimney Date: _____
☐ Metal liner and chimney hat Date: _____
☐ Clay liner (visible clay flue) Date: _____
☐ Guy wires Date: _____
☐ Antenna Date: _____
☐ Protective screen/Spark arrestor Date: _____
☐ Other (specify): _____ Date: _____

Wind (Beaufort scale)
0 Calm, smoke rises vertically
1 Light air, smoke drifts
2 Light breeze, wind felt on face
3 Gentle breeze, small twigs move
4 Moderate breeze, small branches move
5 Fresh breeze, small trees sway
6 Strong breeze large branches in motion
7 Near gale, whole trees moving

Rain
0 None
1 Intermittent
2 Light
3 Heavy
4 Thunderstorm

Cloud cover
1 0-25%
2 26-50%
3 51-75%
4 76-100%
5 Fog

Please return your data sheet to your regional coordinator

Appendix 7: Steps in the process of conducting a Chimney Swift roost survey

The information below is an abbreviated version of the roost survey method and can be printed to bring to the survey if necessary.

Assignment of sites

- Contact the coordinator of the Chimney Swift monitoring program in your region in order to find out the location of known roosts in your region.
- If necessary, in May during the pre-survey period, locate chimneys that could potentially be used as roosts by driving, bicycling or walking around old residential or industrial neighbourhoods. Verify in the evening whether these structures are being used by Chimney Swifts. If this is the case, immediately contact the coordinator in order to include these sites in the program of fixed-date roost surveys.

Survey methods

- The surveys are carried out on four fixed dates in the spring separated by four-day intervals: the second survey evening takes place on the last Sunday in May (or the second-last Sunday in May if the last Sunday in May falls on May 31), the first survey takes place four days before, then the third and fourth surveys take place, respectively, four days and eight days after this Sunday.
- The surveys take place regardless of the weather conditions.
- The surveys begin 30 minutes before sunset under good weather conditions or 45 minutes before sunset when cloud cover is > 75%. The surveys end 30 minutes after sunset.
- Plan on arriving 10-15 minutes before the actual survey start time to allow enough time to find a proper viewpoint of the chimney and to record data on site information and weather conditions.
- On arrival at the survey site, take up position at a safe location that affords a direct view of the chimney. Ideally, two sides of the chimney should be visible.
- Record the information concerning the observer and the location of the site, and note the date, the survey start and end times, and the current weather conditions.
- Note the characteristics of the chimney (only when a new site is discovered).
- Note the time when the first swift enters the chimney.
- Count all the swifts that enter the chimney (subtract those that leave). If many swifts enter at the same time, estimate their number by counting them by groups of 5 or 10 or 15 birds.
- Note any disturbances that may affect the use of the chimney by the swifts during the survey.
- Note any apparent changes made to the chimney since the last survey.
- Note the time when the last swift enters the chimney.
- Note the net number of swifts that entered the chimney and the counting method used.

Other points to remember

- A filming device can be used to film the entrance of the swifts in the chimney while the count is taken by the observer.
- It is recommended to establish a team of observers and to share the survey evenings or to have a replacement if an observer is not available.
- Make copies of the data collection sheets after each survey.
- Send the results of the four survey evenings promptly to the coordinator.
- Report incidental sightings of swifts.

Thank you for your contribution to the Chimney Swift monitoring program!