

LOSS OF CHIMNEYS USED BY CHIMNEY SWIFTS IN LONDON, ONTARIO, 2004–2013

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INTRODUCTION

The Chimney Swift, a fast-flying mite of a bird, has been gracing London's skies during the two centuries since European settlers arrived at the Forks of the Thames. And, undoubtedly, swifts were here for many millennia before that, living in hollow trees and devouring insects on the wing. See Figure 1.

As London grew and chimneys proliferated, Chimney Swifts also flourished. Frances Girling (1914–2010), who began attending McIlwraith Ornithological Club meetings in 1933, reported the species was so common during the 1930s and '40s that local naturalists paid little attention to it. Yet, not many years later, club members began noticing swifts were becoming less numerous. Long before the 1962 publication of Rachel Carson's seminal book, *Silent Spring*, they were attributing this worrisome trend to the post-war appearance and widespread use of DDT.

Fast forward 50 years: by the dawn of the twenty-first century, the wider naturalist community was waking up to the seriousness of ongoing swift declines in Canada. For example, volunteers for the second atlas of breeding birds of Ontario (2001–2005) began commenting on the scarcity of swifts. When final results were tabulated, it was revealed that atlasers were 46% less likely to observe swifts than they had been during field work for the first atlas 20 years earlier.

Analysis of data from the Breeding Bird Survey (BBS) for the 42 years from 1970 to 2012 delivered even more disturbing news. During that period, the BBS documented an average annual decline in Chimney Swift numbers of 7.77% for Ontario. For Canada as a whole, the annual decline rate was 5.81%.

Since 1970, Canada's Chimney Swift population has plummeted by approximately 95%. In 2009, the Chimney Swift was designated as threatened in both Ontario and Canada.

WHY ARE SWIFTS DISAPPEARING?

The big question on everyone's mind is "Why are swifts disappearing in Ontario and Canada?" First, it should be pointed out that the problem is not unique to Chimney Swifts. All aerial insectivores (e.g., swifts, swallows, nighthawks, martins, whip-poor-wills, and flycatchers) are experiencing significant population declines, especially in the northeastern parts of their ranges.

Five or ten years ago, experts were fingering a lack of suitable nesting chimneys as the primary cause of the swifts' troubles in Ontario. A recent Ontario study, however, reported swifts occupying only 24.4% of suitable chimneys, suggesting that a shortage of chimneys is not limiting Chimney Swifts in this province at present.

Recent research indicates that swifts, on average, prefer chimneys that extend approximately 2.86 metres above the roofline and have an internal area of slightly more than one square metre. See Figure 2 for examples of London chimneys occupied by swifts.

It is generally believed that several factors are interacting to cause Chimney Swift numbers to plunge. These may present themselves in the breeding grounds (southeastern Canada and eastern United States), along migratory routes (through Central America) and/or in the wintering range (upper Amazon basin).

Among the concerns most



Figure 1. Chimney Swifts spend their days in flight, zipping across the skies above London, snatching insects from the air. (Illustrated by Diane Kristensen.)

often cited are difficulties involving the food supply, loss of habitat (including nesting sites), use of pesticides, and extreme weather associated with climate change.

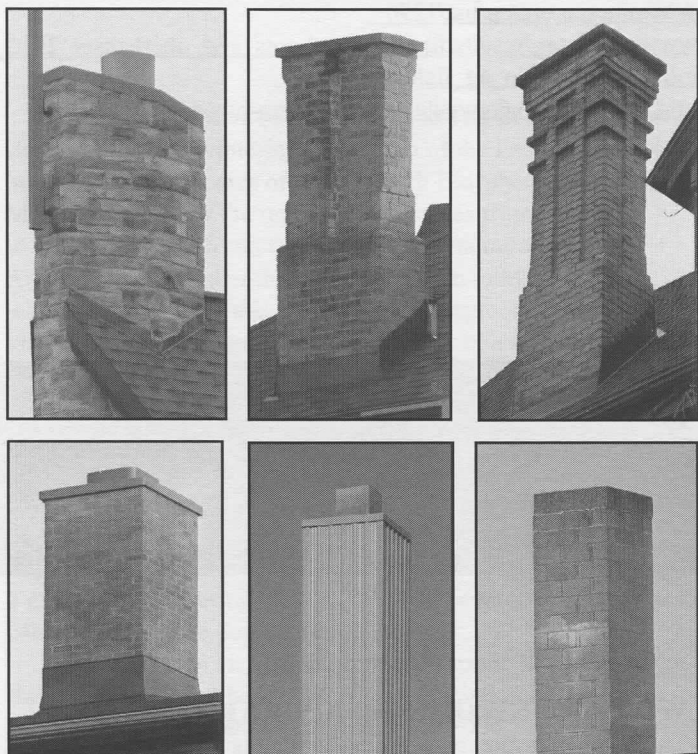


Figure 2. A sampling of London chimneys occupied by swifts, showing typical styles. Left to right, top: a 1950s stone chimney with a terra cotta tile liner, a brick chimney whose upper portion consists of two shafts, an ornate brick chimney on a heritage building; bottom: a 1950s brick chimney with tile, a metal-clad brick chimney topped by a tile, a concrete-block chimney. (Photos by Winifred Wake.)

Data are beginning to accumulate in support of the theory that issues related to food supply may be a major culprit driving swift declines. A study carried out in Kingston, Ontario, for example, demonstrated that, following World War II, the advent of DDT dramatically altered the types of insects available to swifts. This resulted in a major shift in the diet. It has been proposed that the switch to feeding on less-than-optimal species of insects, exacerbated in recent decades by other adverse factors, has been propelling the downward slide in swift numbers.

DOCUMENTING SWIFTS AND SWIFT CHIMNEYS IN LONDON, ONTARIO

In response to news that swifts appeared to be in trouble, in 2004, members of Nature London (McIlwraith Field Naturalists) established an initiative they named SwiftWatch. The goal was to identify and monitor local chimneys occupied by Chimney Swifts for overnight communal roosting during fall migration. Over the next five years, the scope of the operation expanded to include the monitoring of roosts during spring, summer and fall, and the identification of chimneys used only for nesting. As well, a chimney-owner contact program and other outreach endeavours were undertaken.

In the fall of 2008, as Bird Studies Canada (BSC) pre-

pared to launch its provincial SwiftWatch initiative, the Nature London program began to wind down. Some elements (e.g., formal monitoring) subsequently came under the auspices of BSC, while other elements were discontinued. Since that time, members and friends of Nature London have participated in monitoring programs organized by BSC and contributed to its SwiftWatch database. The Nature London club, under the leadership of its Chimney Swift liaison, has carried out additional initiatives related to swifts and their conservation.

In 2004, Nature London began keeping an inventory of London chimneys known to be used by Chimney Swifts (hereafter referred to as swift chimneys). No systematic, city-wide survey has ever been undertaken but, from 2007 to 2009, three volunteers made a concerted effort to seek out such chimneys (excluding those on private residences) in various corners of the city.

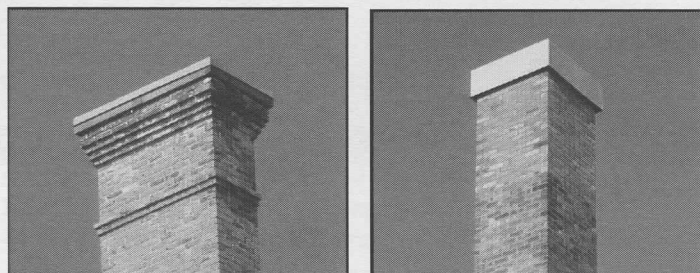


Figure 3. Two known London swift chimneys. A flat metal sheet now covers the left chimney, extending over the rim and slightly down the outside of the rim, preventing access by swifts. On the right chimney, metal has been placed over the rim only, leaving the chimney shaft open for continued access by swifts. Air photos and Google Earth images established which of these chimneys was open and which was closed. (Photos by Winifred Wake.)

After 2010, little effort was expended to identify more chimneys, although a number have since come to Nature London's attention. By 2015, 166 chimneys were on the list. Some of these chimneys have been revisited annually to confirm occupancy by swifts, but many have not been checked for several years. It is believed there are significant numbers of additional chimneys used by swifts in London that are not yet known to the local swift-watching community.

IDENTIFYING CHIMNEYS SUITABLE FOR USE BY SWIFTS IN LONDON

In general, London chimneys used by Chimney Swifts are located on buildings constructed in the 1960s or earlier. As these chimneys age, some are being lost through capping, demolition or alteration. Even if a shortage of chimneys is not currently limiting swift numbers in Ontario, chimneys continue to provide essential habitat in urban areas such as London. It is therefore of interest to track the ongoing decrease in the stock of suitable chimneys that are available to swifts.

Not all older London chimneys are a good match with swift requirements, and distinguishing those that are from those that aren't can sometimes be problematic. Usually, suitability is ascribed by a knowledgeable observer standing on the ground and

making visual appraisals of chimneys. Assessments are based on documented swift preferences related to dimensions of the shaft, construction materials, presence/absence of superstructure on top of the chimney, etc. Unfortunately, this method does not always accurately differentiate between chimneys that are open topped and those that are not. See Figure 3.

Some chimneys that appear to be suitable may actually be topped by a flat metal covering or a slab of concrete, which can sometimes be difficult to distinguish from the rim of an open chimney.

Air photos and Google Earth imagery may help to identify open-topped chimneys but often offer insufficient resolution to do so, especially for smaller-diameter chimneys. In addition, these digital tools are unlikely to recognize a chimney that has been internally blocked somewhat below rim level. Swifts also sometimes choose to occupy chimneys that a human observer would judge unsuitable. Figure 4 shows an example of a London swift chimney that offered challenges in determining whether or not it was accessible to swifts. It was identified as an active swift chimney only when swifts were observed entering and exiting.

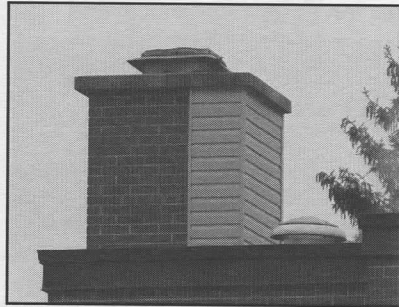


Figure 4. This unusual swift chimney, despite its metal superstructure, regularly hosts a family of nesting swifts. Swifts enter just beside the metal "cap". (Photo by Winifred Wake.)

DOCUMENTING LOSS OF SWIFT CHIMNEYS IN LONDON

The 166 chimneys on Nature London's inventory are a subset of the presumably much larger number of London chimneys occupied by swifts. The Nature London list provides an ideal sample for assessing loss of chimneys actually used by swifts as opposed to chimneys that appear to be suitable for use by swifts. For the purposes of analyses, only the 162 swift chimneys first "discovered" during the ten-year period 2004 to 2013 are considered below. (Four chimneys first found in 2015 are excluded.)

Between July and December of 2015, all chimneys on the Nature London list were visited by an on-the-ground observer who assessed their current status regarding availability to swifts. Where appropriate and feasible, this information was supplemented by an examination of the most recent obtainable City of London air photos (2014) and Google Earth images (2013). In several cases, personal communications from people familiar with individual chimneys supplied additional information. Table 1 presents data relating to the status of the 162 swift chimneys under consideration.

Forty-seven chimneys (29%) are no longer available to swifts. Of these, 23 (49%) have been demolished (entire building gone or chimney cut down to approximately roof level and capped) and 24 (51%) are still extant but have been capped in a way that prevents entry by swifts. In making assessments, it was sometimes difficult for an observer on the ground to ascertain the

Table 1. Status in 2015 of 162 London Chimneys Used by Chimney Swifts 2004–2013

Year chimney first identified	Total chimneys identified	Building demolished ¹	Chimney cut down & capped ²	Chimney extant but capped ³	Chimneys (%) available to swifts ⁴	Chimneys (%) unavailable to swifts
2004	11 ⁵	5		3	3 (27%)	8 (63%)
2005	14		1	6	7 (50%)	7 (50%)
2006	6				6 (100%)	0 (0%)
2007	28		4	4	20 (71%)	8 (29%)
2008	52	2	7	2	41 (79%)	11 (21%)
2009	28		1	8	19 (68%)	9 (32%)
2010	14		2		12 (86%)	2 (14%)
2011	4				4 (100%)	0 (0%)
2012	2				2 (100%)	0 (0%)
2013	3		1	1	1 (33%)	2 (67%)
Total	162	7	16	24	115 (71%)	47 (29%)

¹ building and chimney, or free-standing chimney, or silos, razed to ground

² chimney significantly reduced in height (usually to about roof level) and capped

³ chimney extant but covered in a way that renders it inaccessible to swifts (e.g., blocked internally and such information known to author, or blocked by installation of structures visible from the ground or on most recent air photos or Google Earth images such as animal guard, closed-in chimney hat, flat metal covering, concrete slab, metal structure associated with a furnace conversion, etc.)

⁴ includes chimneys that appear to have at least one open-topped flue; may include an unknown number of internally blocked chimneys

⁵ includes three silos

open versus capped status of a chimney. If this method proved unsuccessful, air photos and/or Google Earth images were consulted. Occasionally information was obtained from an individual who had knowledge that a particular chimney was blocked internally, a feature that was not evident from the ground or in air photos or Google Earth images. Table 2 presents methods by which capped status was determined, and Figure 5 shows examples of types of capping employed.

Table 2. Methods of Determining Status of 25 Capped Chimneys

Type of capping	How chimney status determined		
	Observer on ground	Air photo or Google Earth	Personal communication
Metal superstructure	11		
Mesh animal guard	2		
Metal hood	1		
Flat metal covering		8	
Internal blockage			2
Total	14	8	2

Capped status could be determined by an observer on the ground for only 14 of the 24 capped chimneys (58%). These chimneys featured metal superstructure, animal guard and metal hood. Included in the tally of chimneys sporting superstructure is one that had been internally blocked for a year or two (personal communication) before a metal topknot was installed.

For the 10 of 24 chimneys (42%) for which capping could not be definitively determined from the ground, some had a flat metal covering while others were internally blocked.

One-hundred and fifteen chimneys (71%) are deemed to be still available to swifts. The true percentage accessible to swifts, however, may be somewhat lower, as some chimneys that appear from the ground, to likely be open topped, may actually

be flat capped or blocked internally. For the purposes of this analysis, if a chimney could not be definitely determined to be inaccessible to swifts, it was rated as still available.

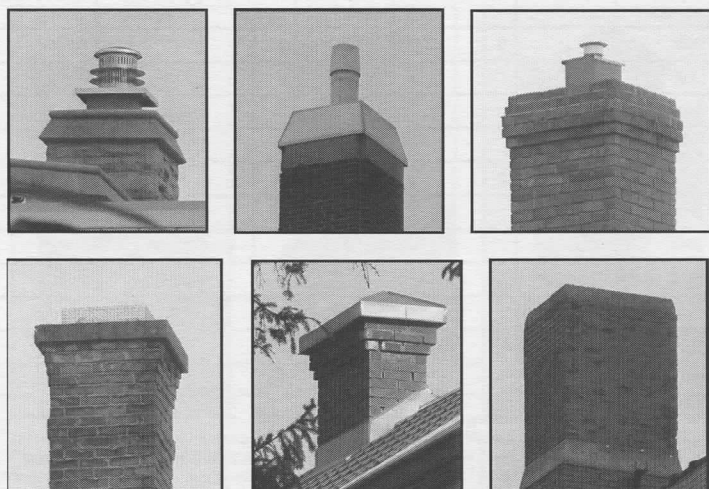


Figure 5. A sampling of methods used to cap chimneys in London. Left to right, top: three examples of metal superstructure; bottom: wire mesh animal guard, metal hood, internal blockage. (Photos by Winifred Wake.)

Of the 115 swift chimneys in the sample that are thought likely to be currently accessible to swifts, many showed visible signs of deterioration. Issues included leaning chimneys, chimneys with saplings growing from them; cracked and crumbling rims; cracked, chipped, sloughing, loose, pitted and missing bricks; crumbling, loose and missing mortar; and water and smoke stains. Relatively few chimneys showed no obvious indications of problems. See Figure 6 for typical issues displayed by London swift chimneys. Without maintenance, a significant portion of London's existing stock of swift chimneys may not be extant in five, ten or fifteen years.

HOW MANY CHIMNEYS DO SWIFTS NEED?

To determine the number of chimneys needed by a local population of Chimney Swifts, considerable research would be required. In the meantime, it is possible to discuss the matter in generalities.

The findings reported in Table 1 quantify a steady and ongoing loss of known swift chimneys in London. Although swifts themselves are also in decline, it is hoped they will continue to live and nest successfully in London in future decades and will not ultimately be limited by lack of suitable housing (chimneys). And, if current declines can be reversed, swifts will need more, not less, nesting and roosting habitat.

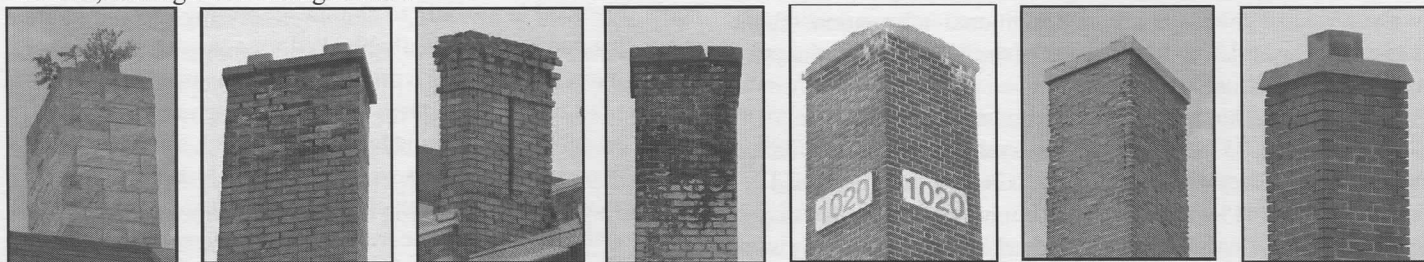


Figure 6. London chimneys used by swifts, showing various forms of deterioration: saplings growing from chimney, missing mortar, sloughing bricks, cracked and crumbling rims, lime deposits from flowing water, etc. (Photos by Winifred and Dave Wake.)

To date, efforts in Canada have been unsuccessful in developing an artificial chimney prototype that swifts will occupy. It was recently reported that, of more than 60 known artificial swift towers erected in five Canadian provinces, none was used by nesting swifts with the exception of a heated shaft in Quebec.

Four additional artificial swift structures are known in London. One, an artificial chimney made of concrete blocks, was installed on a downtown London rooftop. Three structures located near natural habitat were created from cut-down fireplace chimneys after the buildings around them had been demolished (when intact, the three original chimneys had not harboured swifts). None of the four structures has attracted swifts to date. See Figure 7 for examples of artificial swift structures in the London area. It appears that Canada's swifts, especially urban ones, will continue to depend heavily on old brick chimneys in the foreseeable future.

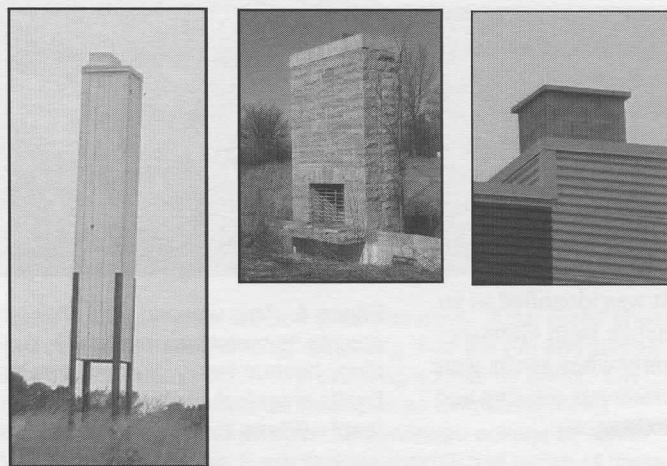


Figure 7. Examples of artificial structures created in London and area for use by swifts. Left to right: a free-standing tower, a cut-down fireplace chimney, a concrete-block imitation chimney (to date none of these has been occupied by swifts). (Photos by Winifred Wake.)

Swifts usually first breed when they are two years old. They mate for life and pairs return to the same chimney to nest each year, at the rate of one pair per chimney. Having their own chimneys still available when they arrive in London each spring may mean less stress for returning pairs.

Even when current declines are considered, local populations of swifts require the availability of a pool of suitable chimneys that is somewhat larger than the number of breeding pairs. There are several reasons for this. The number of breeding pairs may fluctuate from year to year. Having a number of spare chimneys on hand will allow new locations to be selected if former nest

chimneys have been capped or demolished or become uninhabitable for other reasons (see Figure 8 for an example of a chimney that was cut down and capped). Preserving more than the bare minimum of suitable chimneys required by established swift pairs permits new pairs to choose suitable chimneys of their liking. It also allows non-breeders opportunities to check out potential nest chimneys for use in a future breeding season.

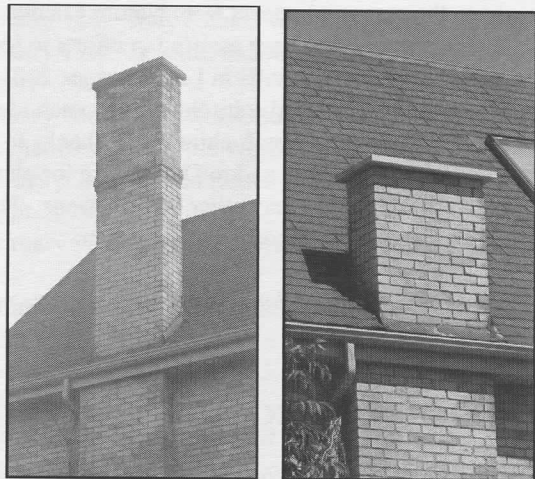


Figure 8. A London chimney used by swifts for nesting. Left: the original chimney. Right, the same chimney after it was cut down and capped with a concrete slab. (Photos by Winifred Wake.)

Non-breeding swifts require chimneys for communal nighttime roosting. Since 2004, more than two dozen different London chimneys have harboured communal swift roosts, though the locations and numbers of active roost chimneys vary considerably from year to year. See Figure 9 for examples of London chimneys used by swifts for communal roosts.

Three traditional chimneys usually serve as roosts for non-breeding swifts during spring migration and throughout the nesting season, while many more roosts are active during fall migration. After young have fledged, parents and offspring may join other swift family units in small neighbourhood roosts before moving on to larger roosts elsewhere in the city.

Since 2004, swifts have been observed roosting communally in 29 different London chimneys. At some of these, roosting activity has been of short duration or involved relatively small

numbers of swifts. Five roost chimneys (including three silos) have been demolished, and six have been capped, leaving 18 roost chimneys available to swifts.

During fall migration in a given year, usually not more than ten chimneys will be known to harbour roosting swifts, and some of these may be active for only a few days. While some chimneys tend to host large roosts year after year, swifts also seem to like to move about, picking and choosing different roost sites to occupy for shorter periods. It is likely that additional London chimneys are used for roosting but have not yet come to the attention of local swift watchers.

Several London chimneys that held large swift roosts five to ten years ago have rarely harboured large roosts in more recent years, though they are apparently still accessible to swifts (evidenced by the use of these chimneys by nesting swifts). Because swifts may switch roost sites from week to week or year to year, it is very difficult to accurately document all roost chimneys that are active at one time or in a particular year.

When nesting, roosting and other needs are taken into account, it is clear that the minimum number of suitable chimneys required by local swifts is considerably larger than the number of nesting pairs present in a given season. In determining which chimneys are the most important to preserve, priority should be given to ones that have had current or recent swift occupancy. Swifts themselves should be the ultimate authorities in deciding which chimneys best serve their needs, especially since they are known to sometimes use chimneys whose specifications do not match the preferences of the majority of swifts.

Researchers have developed ways to quantify chimney characteristics and predict which chimneys are likely to be most desirable to swifts. It is appropriate that additional chimneys selected for protection be chosen from ones deemed by swift experts to be most suitable.

SUMMARY AND CONCLUSIONS

It is thought that Chimney Swifts in Ontario are not currently limited by a shortage of suitable chimneys. The loss by 2015 of 29% of London chimneys that harboured swifts between 2004 and 2013 is likely an underestimate. Chimney loss appears to be continuing unabated.

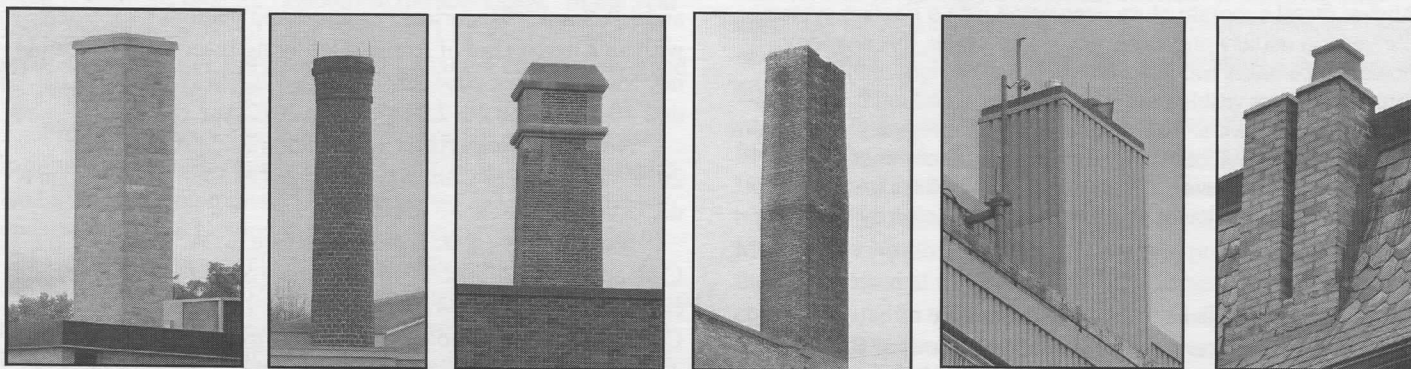


Figure 9. Examples of London chimneys used by swifts for communal roosting. Left to right: three chimneys that frequently harbour large roosts in the spring, summer and/or fall; a chimney that often hosts a large fall roost (many years ago this chimney was cut down in height but has continued to accommodate swifts; note the deterioration along the top edge; the owners of this chimney have indicated they plan to take the chimney down in the future); a metal-clad roost chimney; a chimney that has hosted a small roost (swifts enter via the chimney pot on top; the left shaft of the chimney is flat capped). (Photos by Winifred Wake.)

Migrating and seasonally resident swifts in London need chimneys for nesting and roosting. In addition, if any success is achieved in stemming the decline of swift populations in Ontario, an increase in numbers of suitable chimneys or other structures may be needed in the future.

At present, preserving chimneys known to have been recently or currently occupied by swifts, plus protecting a number of similar chimneys, seems to be the most feasible and beneficial option for ensuring that appropriate roosting and nesting habitat remains available for London's swifts. At this time, this is considered to be a more judicious course of action than pursuing expensive attempts to create alternative structures of dubious suitability for swifts.

It is believed there are many London chimneys used by swifts that have not been checked for swift occupancy. It is important that all chimneys that appear to have potential for hosting swifts be checked for swift activity before permits are issued for alteration or demolition. Figure 10 shows examples of chimneys that harbour swifts, though, at first glance, they appear to be unlikely candidates to do so.

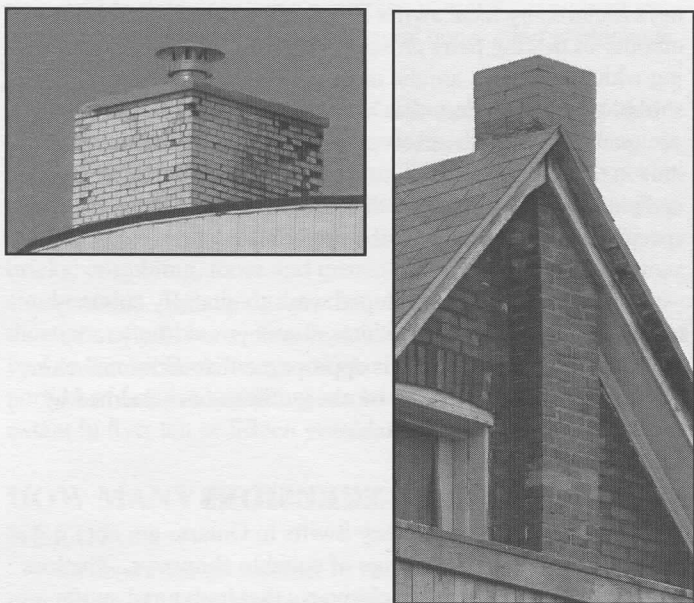


Figure 10. Two London chimneys occupied by swifts that do not fit the standard profile of chimney types preferred by swifts. Above: metal superstructure associated with a heating system conversion usually precludes access by swifts; this chimney, however, contains two flues (shafts). To the right of the metal topknot and not visible from the ground is a second flue that remains open to swifts. Right: most swift chimneys are a minimum of 2.5 bricks by 2.5 bricks wide on their exterior dimensions. This chimney, however, is just 2 bricks by 2 bricks and does not appear to broaden lower down the shaft. (Photos by Winifred Wake.)

To ensure swifts have an adequate supply of housing in London in future years, action is needed on several fronts:

- the stock of suitable chimneys actively used by and/or available to swifts must be inventoried and tracked
- a process must be developed whereby deteriorating swift chimneys receive appropriate maintenance
- regulatory authorities must act to protect known swift

chimneys as well as additional chimneys (for use by new pairs, for communal roosting, etc.).

In addition to the necessity of initiatives to protect and conserve swift chimneys, there is an urgent need to address critical problems related to the swifts' food supply.

ACKNOWLEDGEMENTS

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(Winifred Wake is Nature London's Chimney Swift liaison.)

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