

THE FIRST USE OF PURPOSE-BUILT ARTIFICIAL CHIMNEY SWIFT HABITAT IN MANITOBA

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The Chimney Swift (*Chaetura pelagica*) is a long-distant migratory bird that catches insects in flight.¹ Chimney Swifts have adapted to urban environments by breeding in anthropogenic structures, primarily brick chimneys attached to buildings.¹ Prior to the establishment of western settlements, Chimney Swifts nested in cavities in trees, switching to anthropogenic structures as a response to the clearing of riverine forests during urban expansion.¹ A severe decline in the Canadian Chimney Swift population (estimated to be about 90 per cent from 1970-2017²) resulted in the species being listed as Threatened under both the federal Species At Risk Act³ and the Manitoba Endangered Species and Ecosystems Act³, and being listed globally as Vulnerable.⁴ The likely reasons for this decline include reduced availability of aerial insects³, demolishing, capping and lining of brick chimneys³, and reduced productivity due to severe weather events.³ To date, conservation action has been focused on the creation of new habitat by way of artificial chimneys in the form of free-standing towers⁵, retention and restoration of existing habitat, and public outreach.³

In Manitoba, the Chimney Swift nests in aspen parklands and along the southern boreal edge from Lac du Bonnet northwest to The Pas.⁶ The Manitoba Chimney Swift Initiative (MCSI), a partnership that includes representatives from Nature Manitoba, the Government of Manitoba, the Government of Canada, Birds Canada, and professional biologists, was established in 2007. Its aim was to reverse long-term population declines

by replicating the Chimney Swift tower designs successfully deployed in multiple jurisdictions in the USA.^{5,7} Recent data demonstrated a loss of habitable chimneys at a rate of 14.5 per cent over 10 years in southern Manitoba prompting the decision to explore habitat replacement as a reasonable mitigation measure.⁸ Seven 12-foot (3.66 m) free-standing chimneys following the design as described by Kyle and Kyle⁵ were constructed between 2008 and 2013 but to date there has been no evidence of Chimney Swifts using these structures.⁷

The failure of these towers to attract swifts and provide alternative breeding habitat has presented a challenge to conservationists, most notably in cases where the loss of known Chimney Swift habitat legally must be mitigated under the Manitoba Endangered Species and Ecosystems Act. MCSI believes that the primary reasons that the original towers failed to attract swifts was a lack of internal temperature stability (especially in May when the birds begin to select nesting habitat) and the short tower height.⁷ Jurisdictional by-laws in Winnipeg and surrounding towns prevented construction of free-standing structures taller than 12 feet (3.66 m). MCSI noted that rain water would wet the top of the internal wall up to 3 m of the 3.66 m towers, which could potentially threaten a nest constructed on the wall.⁷ Designing a tower that could provide temperature stability and be structurally sound at the maximum height became a priority for future mitigation.

An opportunity to construct a larger tower for Chimney Swifts was part of the re-development of a

property in Winnipeg. In fall 2014, a large stack chimney attached to the Old Grace Hospital in the Wolseley neighbourhood which was used for multiple years by a nesting pair of Chimney Swifts, was removed due to structural degradation. A working group was established to design a 'made for Manitoba' Chimney Swift tower to replace the chimney.

The new artificial chimney was designed with a number of added elements lacking in the original plans. The replacement structure needed to be taller than 3.6 m and have added insulation, consequently requiring a variance from the City of Winnipeg and engineered drawings. The tower would also eventually need to be moved to a permanent location; hence, it was constructed in three modules each measuring 3.6 m high. Each module was connected on the outside by metal brackets, and a small internal lip was formed at the joint between sections. When constructed, the 10.8 m tower was set on a cement pad. Due to delays in construction, the tower was not erected until late July 2015, and Chimney Swifts were not observed using the tower ahead of fall migration. Subsequently, it was taken down and a new artificial chimney was incorporated into the new building.

Following the removal of the tower from the Old Grace Hospital site, the Province of Manitoba and MCSI developed a partnership with the Assiniboine Park Conservancy to provide a permanent home for the tower on Assiniboine Park Zoo grounds. The criteria for determining suitable location included proximity to trees as Chimney Swifts require twigs to build their nests¹, access to foraging grounds around the Assiniboine River, proximity to other Chimney Swift nest and roost locations, and accessibility for volunteers to monitor the tower

outside of zoo operating hours. Zoo staff were able to identify a site to meet the criteria within the grounds of the McFeetors Heavy Horse Centre and along the north perimeter of the zoo.

The tower was reconstructed in spring 2018 before the expected date when Chimney Swifts return to Manitoba (Figure 1). The tower was monitored from late May to mid-August by MCSI volunteers and Zoo staff. While no occupancy was detected in 2018, on 27 May 2018 a pair of Chimney Swifts were observed flying above the tower while 'V-ing' (T. Poole, unpublished data). 'V-ing' is thought to indicate pair bonding and involves the wings snapping upwards at an acute angle.^{1,9} Although no swifts were

observed entering the tower in 2018, the observed behaviour indicated that a bonded pair may have shown interest but not selected it as a breeding site.

Monitoring restarted on 16 May 2019. On 7 June, Assiniboine Park Zoo staff observed two Chimney Swifts leaving the tower during the afternoon. This was the first confirmed use of a Chimney Swift tower in Manitoba. Throughout the summer, swifts were observed over, and entering the tower on a regular basis (Table 1, Figure 2). On 1 August, a single Chimney Swift made several failed attempts to enter the tower during daytime. Failed and clumsy attempts at entering a chimney are indicative of an inexperienced bird, associated with

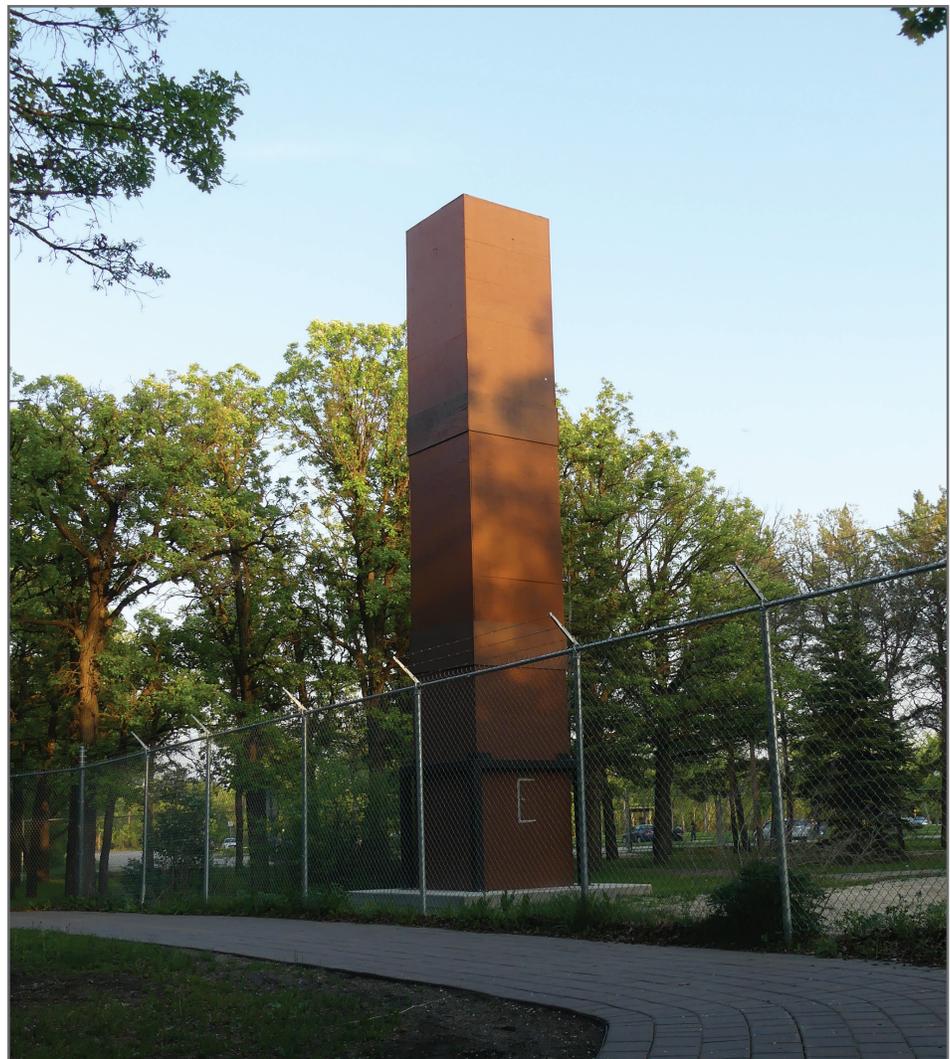


FIGURE 1. The tower in its current location at Assiniboine Park Zoo. Note the three distinct sections, the supportive bracket around the base and the concrete pad. Photo credit: T. Poole.

TABLE 1. Summary of observations of the Chimney Swift Tower at Assiniboine Park Zoo during the 2019 monitoring season. Monitoring sessions were 60 to 90 minutes.

DATE	TIME OF DAY	NUMBER RECORDED INSIDE TOWER	COMMENTS
16 May	Evening	0	Chimney Swifts in area but no entries
22 May	Evening	0	No Chimney Swifts observed
26 May	Evening	0	No Chimney Swifts observed
30 May	Evening	0	No Chimney Swifts observed
7 June	Morning	2	Exited the tower
8 June	Morning	1	One Chimney Swift entry followed shortly by one exit, indicative of possible nest building
9 June	Afternoon	1	Chimney Swift exited the tower
14 June	Morning	0	Chimney Swifts in area but no entries
14 June	Evening	3	Nest building believed ongoing based on several entries and exits before roosting
20 June	Morning	3	All entered tower
23 June	Evening	3	All entered tower
10 July	Evening	2	Entered tower
16 July	Evening	1	Chimney Swift entered tower
1 August	Morning	1	Multiple failed attempts to enter tower, indicative of a fledgling
8 August	Morning	1	Entered tower
22 August	Morning	0	No Chimney Swifts observed



FIGURE 2: Still image taken from a video of a Chimney Swift entering the tower. Photo credit: T. Poole.

fledging.⁹ The observer also noted no obvious signs of molted feathers along the primary wing feathers, another indication that this was a fledged swift.⁹ This confirms that the Chimney Swifts using the tower successfully raised at least one chick to fledge. Monitoring continued until late August when no Chimney Swifts were observed and it was assumed that the birds had migrated (Table 1).

An inspection of the interior of the tower in September 2019 revealed that three, possibly four eggs hatched inside the tower. There was also a single unhatched egg and the carcass of a deceased adult bird. An inspection of the wall revealed that a nest had been constructed below the lip where the bottom section of the tower connects to the middle section, at a height of approximately 3.6 m from the base of the tower (Figure 3). Zoo staff retrieved the nest from the tower during the winter of 2020. The nest was empty, confirming that a minimum of three chicks fledged during the summer of 2019.

Discussion

This is the first documented instance of Chimney Swifts using and attempting to breed in an artificial chimney in western Canada.* The observed behaviour of one bird indicated that at least one chick fledged from the tower in early August. While it is possible that the fledgling observed came from a different nest site, as has been observed for sites within 100 m of each other in St. Adolphe (B. Stewart, per. comm 2019), the physical evidence indicates three to four Chimney Swifts were fledged from this artificial chimney.

The presence of a third Chimney Swift, and the regular observations of

*Behavioural and physical evidence indicate the tower was also used as a nest site in 2020.

daytime use of the tower suggested that this breeding attempt was being supported by a helper, a non-breeding swift believed to assist with incubation, brooding and feeding.¹ The decomposing carcass of a dead swift in the tower may explain the disappearance of the third adult bird noted during observations. It is unclear as to how the bird died due to the state of decomposition.

Conclusion

The first example of a successful artificial chimney in Manitoba provides a blueprint for future habitat creation. This tower differed from previous, unsuccessful ones, in being significantly larger in both height and internal dimensions. The data have yet to be analysed but we also suspect the added insulation reduced internal temperature fluctuations. Regardless of which parameters made this tower successful, its success has significant conservation implications. It is possible to provide a suitable alternative breeding structure in Manitoba to mitigate for the loss of chimneys due to urban development,

heating system upgrades, and public safety. This is the second example of the Manitoba *Endangered Species and Ecosystems Act* being used to replace lost habitat. In the first instance, a chimney on an apartment in Winnipeg was unscreened following the lining of a second chimney on the same building.¹⁰ This project also demonstrates the value of partnerships across sectors for successful conservation. Developing such cross-sector partnerships will be key to conserving the Chimney Swift in Manitoba.

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FIGURE 3. Nest on the wall of the tower, taken from underneath in September 2019. Photo credit: T. Poole.

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