2019 Swallow Post-Breeding Roost Monitoring – Summary of observations

Aly Hyder Ali, Alex Bencke & Ted Cheskey
August 2019

This report is a summary of the field monitoring data that was collected from the 2019 post-breeding swallow roost-monitoring season, occurring from late July to the start of September. We want to acknowledge the time and efforts of our cherished volunteers and partners for the entirety of the roost monitoring season. We also acknowledge the financial support from Ontario Trillium Foundation for our *Save Our Swallows* campaign – which sets out to protect the declining populations of swallows commonly found in Ontario. This report is a continuation of our roost-monitoring efforts undertaken in 2018, and we hope that this presents an accurate understanding of the roosts that were monitored in the last two years. We hope that this report also highlights the necessity for continued long-term study of roosts and roost sites in Ontario, to unravel the many mysteries of post-breeding swallow roosts, in hope of affording some protection to them and the vulnerable swallow species that congregate there.

Most of the six species of swallows found in Ontario gather in large roosts in the Southern Great Lakes region of the province, after the conclusion of the breeding season and prior to undertaking their long-distance migration to the wintering areas in the south. Some species, such as Bank Swallows, can start roosting well in advance of other swallows, often before the end of their breeding season. These roosts are congregations of large numbers of swallows, ranging from hundreds to hundreds of thousands of individual birds and can often be large enough to be detected by weather radar when they depart the roost sites in the early hours of the morning. Even though roosts can contain a huge number of swallows, they are still ephemeral, and are mostly gone by the start of September. Although more research is required, it is clear that roost sites deserve protection as there is such a huge concentration of declining birds, including at-risk species such as Bank and Barn Swallow. It should be noted that swallows are not the only species that form roosts in this manner. Blackbirds, Starlings and some other species also make large post-breeding roosts, sometime in the same area as swallows, but have different phenology.

After a busy pre-monitoring and planning season, which included webinars, farm events, and MOTUS tagging on Purple Martins, Nature Canada's staff (Ted Cheskey, Vanessa Fiore, Alex Bencke and Aly Hyder Ali), along with local project partners and volunteers monitored roosts at nine different locations, along Lake Ontario and Lake Erie throughout the month of August as shown in Figure 1. In 2019, there was clear evidence of swallow roosts in seven of the nine sites that was monitored. Last year there was evidence of swallow roosts in only three of the seven (Point Pelee, Long Point & Dunnville) monitored sites. Monitors were unable to visit roost sites near Rondeau Provincial Park and the Detroit River due to higher than usual water levels. Based on weather radar imagery, both locations did have active roosts in 2019. There was no formal monitoring of the very large roost in the territory of the Bkejwanong First Nation.

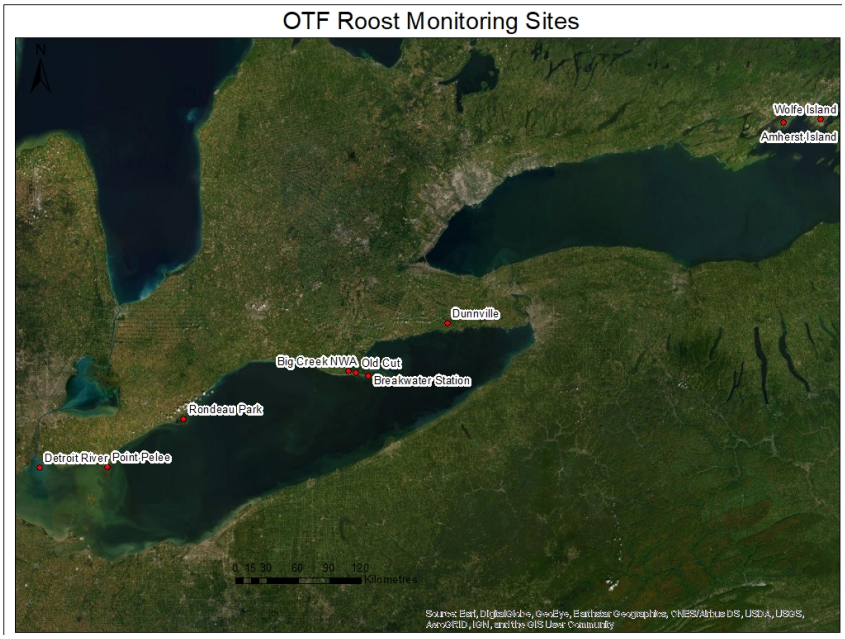

Figure 1: *A map of the nine sites along Lake Ontario and Lake Erie surveyed by Nature Canada during the 2019 roost-monitoring season*

Highlights

The 2019 roost monitoring season was encouraging, in that we were able to resume our past efforts and acquire key results that substantiated our past roost monitoring data. Long Point Bird Observatory and Birds Canada staff put in a significant effort to determine numbers of birds and species in the complex of roosts in wetlands along the Long Point Peninsula which appears to be extremely important for Bank Swallows in particular. Our dependable monitors at Point Pelee provided regular and consistent observations of that roost, and the large number of Purple Martins that it supports. The Dunnville roost, discovered a few years ago by Megan MacIntosh, was well-documented by NC staff and local volunteers again this year and, of the nine roost sites monitored appears to be the most important for Purple Martin. Our Kingston area crew did a great job of tracking roosts on Amherst and Wolfe Islands. Finally record high water levels discouraged detailed monitoring of two radar-visible roosts, one at Rondeau Provincial Park and the other along the Detroit River.

Partners

This year's roost-monitoring was conducted by the following partners.

- Ontario Purple Martin Association
- Holiday Beach Migration Observatory
- Essex County Field Naturalists Club
- Sydenham Field Naturalists
- Ruthven Park National Historic Site
- Kingston Field Naturalists
- Birds Canada
- Long Point Bird Observatory

Point Pelee:

Survey location: Point Pelee roost at Mersea Road 6 and Mersea Road 19 (41.986918, -82.515333)

- Monitoring was done along the dikes

Survey dates: July 23rd – August 29th 2019

Number of visits: 12

Roost Monitors: John Balga, Ron Delcourt, Paul Pratt

Summary Graph:

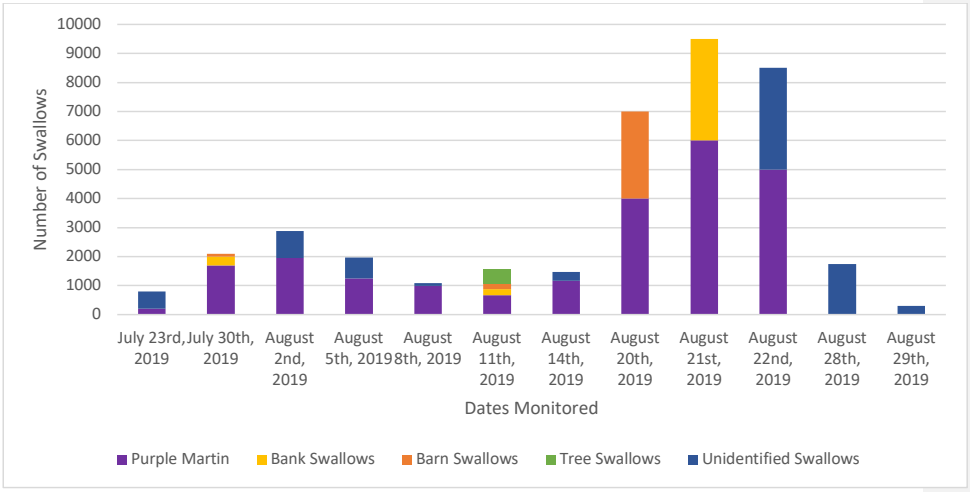

Figure 2. Graph shows the estimated number of swallows by species observed over the monitoring period at Point Pelee, 2019.

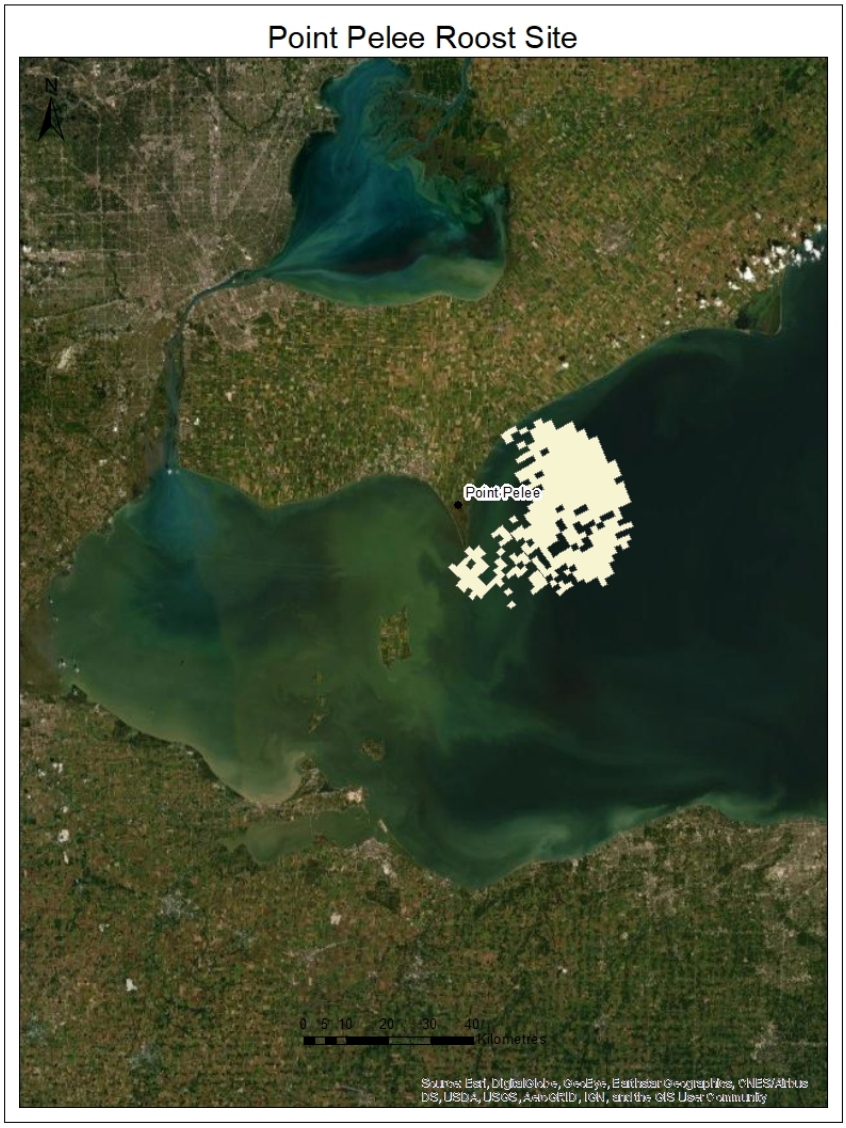

Figure 3. Sample of roost forming over Point Pelee, August 15th 2017.

Long Point (Long Point Bird Observatory):

Breakwater Station

Survey location: 42.561185, -80.2844928

Survey dates: July 31st – August 30th 2019

Number of visits: 31

Roost Monitor: Matt Timpf

Summary:

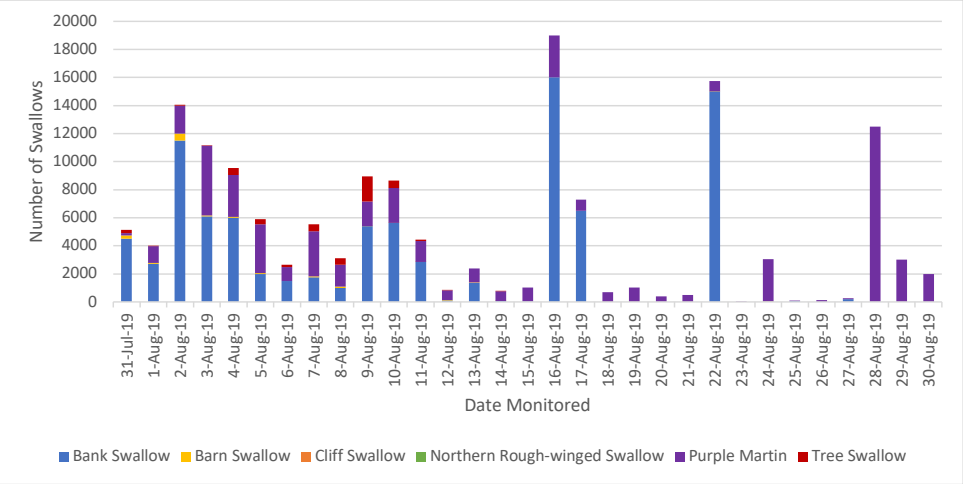

Figure 4. Graph shows the estimated number of swallows by species observed over the monitoring period at Breakwater, 2019.

Long Point – Old Cut

Survey location: 42.582500, -80.398499 (Old Cut at Long Point Bird Observatory)

Survey dates: August 14th – 21st 2019

Number of visits: 8

Roost Monitor: Emma Buck

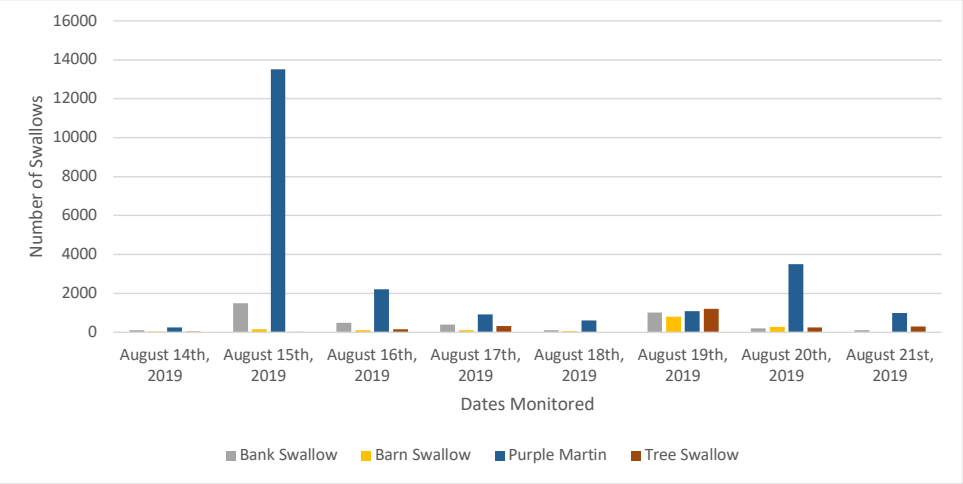

Figure 5. Graph shows the estimated number of swallows by species observed over the monitoring period at Old Cut, 2019.

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Long Point – Big Creek National Wildlife Area

Survey location: 42.593333, -80.454722

Survey dates: Aug 24th – 29th 2019

Number of visits: 6

Roost Monitors: Long Point Bird Observatory Staff

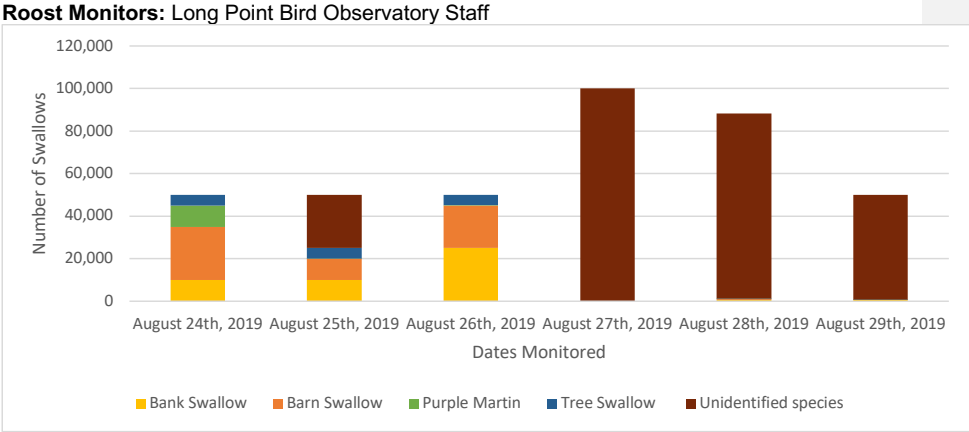

Figure 6. Graph shows the estimated number of swallows by species observed over the monitoring period at Big Creek National Wildlife Area, 2019.

Figure 7. Example roost forming over Long Point, August 17th 2017.

Dunnville, ON:

Survey location: 42.892169, -79.603573

Survey dates: Aug 16th – 23th, 2019

Number of visits: 5

Roost Monitors: Aly Hyder Ali, Alex Bencke, Carl Brown & Patrick Kramer

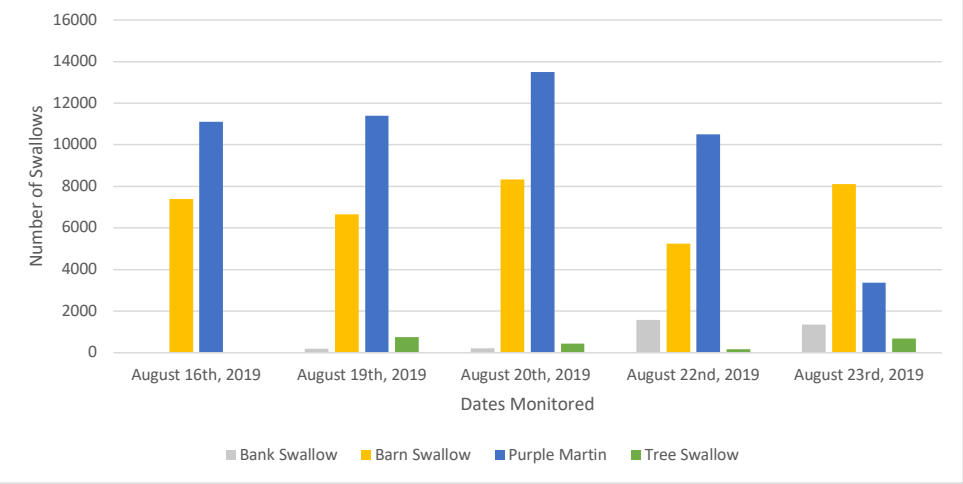

Figure 8. Graph shows the estimated number of swallows by species observed over the monitoring period at Dunnville, 2019.

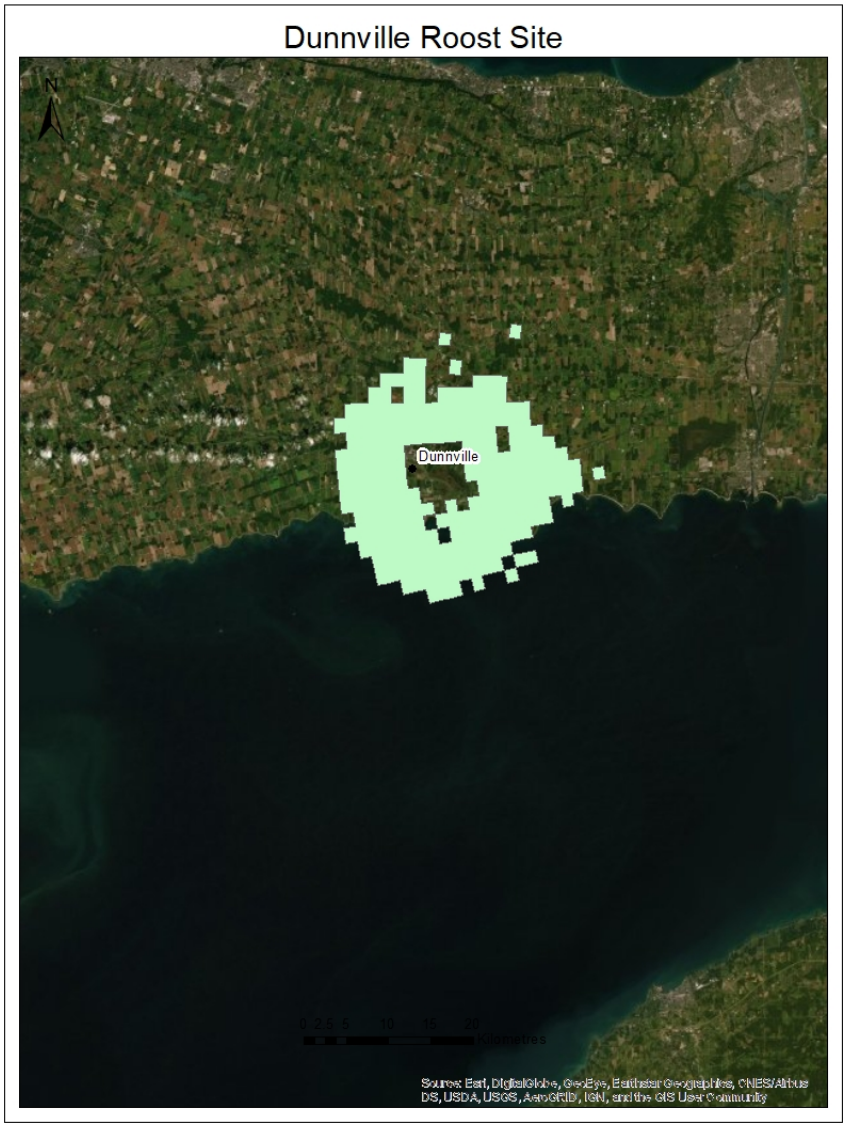

Figure 9. Example roost forming over Dunnville, August 14th 2017.

Amherst Island:

Survey location: 44.136078, -76.683261

Survey dates: July 31st – Aug 28th, 2019

Number of visits: 5

Roost Monitors: Kurt Hennige

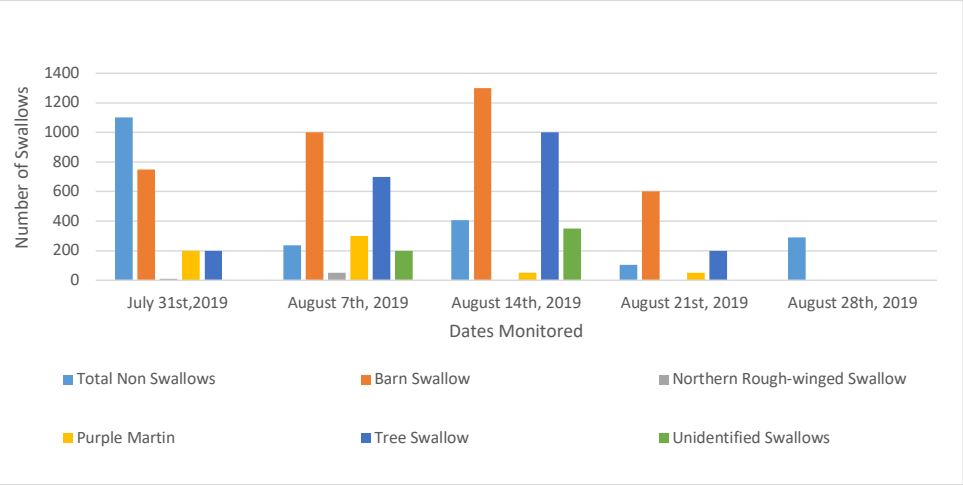

Figure 10. Graph shows the estimated number of swallows by species observed over the monitoring period at Amherst Island, 2019.

Wolfe Island

Survey location: 44.202806, -76.357210

Survey dates: Aug 1st – Aug 22nd, 2019

Number of visits: 4

Roost Monitors: Kurt Hennige, Dr. Barrie Gilbert, & Mark Read, Vanessa Fiore & Ted Cheskey

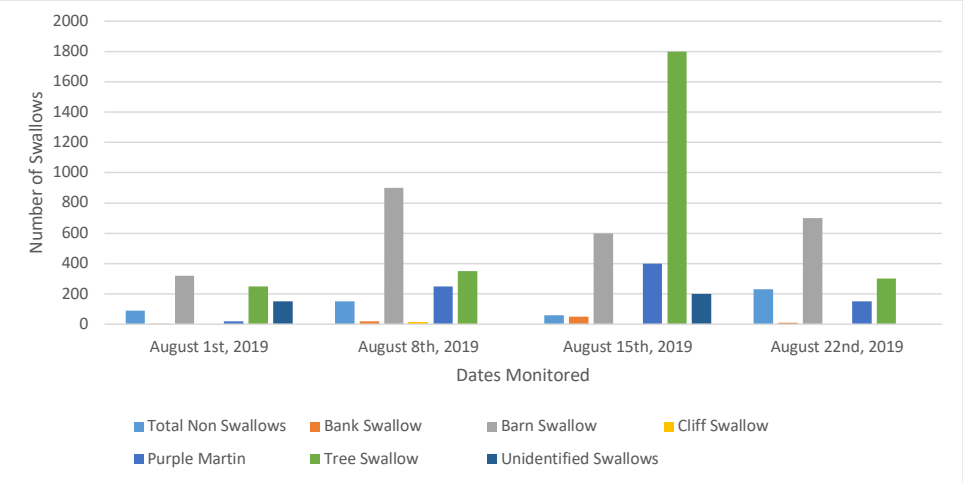

Figure 11. Graph shows the estimated number of swallows by species observed over the monitoring period at Wolfe Island, 2019.

Figure 22. Example roost forming over Amherst and Wolfe Islands, August 14, 2008.

Radar detection of roosts.

Nature Canada has undertaken exploratory work for over two years on the use of weather radar as a means of detecting post-breeding, pre-migratory swallow roost, and tracking changes to them over time. We produced a volunteer guide for accessing different sets of weather data from the WSR-88D Radar mosaic, operated by the National Oceanic and Atmospheric Administration (NOAA). These data are available upon request from Nature Canada.

This year, thanks to the work of Carleton Geomatics student Alex Bencke, we have begun the process of quantifying some roosts, or converting the visual image produced by weather radar to a numerical value that represents quantifiable characteristics of the image. The goal of this work is to answer questions such as "have roosts declined in size and number over time in a way that reflects known changes to swallow populations as measured by the Breeding Bird Survey?" Alex produced the analysis shown in Figure 13, comparing two similarly-sized roosts over a 20-year period, one at Point Pelee, and one on the Grand River near Dunnville. While this work is preliminary, it does provide interesting insight into how roost size fluctuates from year to year, and begs the question of how two roosts that are 250 kilometers apart show virtual identical patterns over time. Our interpretation is that the size of these roosts from year to year are likely most heavily influenced by the same large-scale phenomena such as seasonal weather patterns (i.e. cold and prolonged springs that impact reproductive output).

We hope to continue this work into the future.

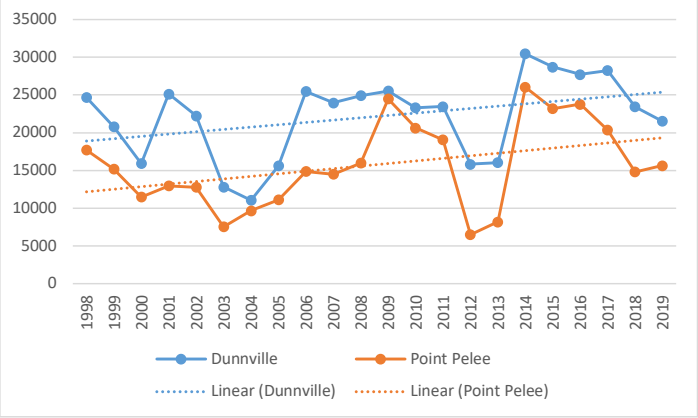

Figure 33. Graph representing the population trends and distribution over the study period at Point Pelee and Dunville, 1998-2018. The number of birds is on the y-axis, and the year is on the x-axis.

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Although manual radar quantification provides an unprecedented ability to carefully describe population patterns of roosts, it is quite time and manpower intensive. Through the implementation of CNNs (convolutional neural networks), greater accuracy and efficiency can be attained. One example of machine learning was created by Dr. Daniel Sheldon from the University of Massachusetts, where he designed a program to delineate, categorize, and track roosts as they form. After the algorithms have identified roosts, the user is able to interface with this data through an easy-to-use GUI that allows the further parsing of the data into nominal categories that can further identify what the roost is. For example, there are options for non-swallow roosts, man-made interference – such as windmills, precipitation events that appear as swallow roosts, and false positives. After analysis, the data can be exported as a georeferenced CSV file that can be used in any GIS application. By using machine learning to identify and track roosts, it eliminates a large portion of man hours that can be used for other tasks, such as field monitoring, as well as increasing the accuracy of the results by eliminating human error from the observations

Purple Martin and Motus transmitters

From July 8 – 12th, in collaboration with Dr. Kevin Fraser from the University of Manitoba, and Saeedeh Bani Assadi, a Purple Martin researcher and PhD candidate at the University, we deployed MOTUS transmitter tags on 46 Purple Martins in three different locations in Southern Ontario (Mitchell's Bay, Port Burwell & Ruthven Park near Cayuga). This research project was conducted to gain a better understanding of the migratory patterns of Purple Martin. Data from 2019 deployments will be analyzed over the next months, and added to a database from the previous two years. Based on data analyzed from 2017 and 2018 (when Motus-tags were deployed on Martins from Holiday Beach, near Port Bruce on Lake Erie, and Amherst Island on Lake Ontario) by Saeedeh Bani Assadi, it is apparent that Martins move frequently and considerably between roost sites after leaving their nesting colonies with juvenile birds, in general, wandering further. Based on Motus detections, much of these movements appear to be oriented along the same plane as Lakes Erie and Ontario, suggestion that coastal areas along the lakes are of considerable importance to these birds. This type of information can help us identify key roost sites and prioritize the sites that need immediate protection, while better understand potential threats to the birds.

Comments:

Although the roost monitoring efforts from the last two years (2018 & 2019) have provided valuable insight on the swallow population density and species composition of the monitored roosts, it is clear to see that additional research and monitoring is required. Even though we have a better understanding of how many swallows, and what species of swallows use the roosts, that information can be improved if there was daily monitoring (as was the case at Long Point for one of their sites). Data from various sources demonstrate that roosts are dynamic and constantly changing. If we are to answer questions such as where are the most important roosts for species X (potentially critical habitat), we still cannot answer that with confidence. Our work has been limited to some, but not all known roosts, which is also limited by detectability by proximate US weather radar. Using radar to detect roosts at hundred or more kilometers from the US border will require access to Canadian weather radar data. Also, we are still only just beginning to understand *why* swallows use the roosts. In essence, the more we learn about roosts, the more we realize there is to learn. Nonetheless, it is clear that with so many declining and threatened birds massing in such close proximity to each other, it is of the utmost importance to protect roost sites, which ultimately will contribute to the recovery of our declining swallows. This remains our overwhelming goal, and one which we want and need your support. Roost protection should be paired with efforts to protect and improve breeding habitat and also better understand threats when the swallow species are beyond our borders.

Our work to identify and measure changes in roosts over time is still ongoing, and we hope that in the near future we will have some promising new results to share with you all.

If you are interested in finding more information on monitoring post-breeding swallow roosts, please contact info@naturecanada.ca or call 1-800-267-4088. For all other information relating to Nature Canada's Save Our Swallows campaign, visit www.naturecanada.ca/SOS