



Warner Parks Bird Information Research and Data (B.I.R.D.) Program

2023 PURPLE MARTIN REPORT

Introduction: Purple Martins, (PUMA) *Progne subis*, is our largest swallow and is part of a suite of species called aerial insectivores, meaning they capture their prey (large insects) on the wing. Purple Martins breed here in the summer (Figure 1) and produce just one clutch of young. Once the young have fledged, they join thousands of other martins at pre-migration roosts in the area before migrating to South America for the winter. ¹

In the eastern U.S., Purple Martins now nest almost exclusively in man-made nests such as martin gourds or houses. Given this strong association with humans and the significant decline in aerial insectivores over the past several decades, Warner Parks initiated a research project on Purple Martins in 2000 to assess martin reproductive success at numerous locations throughout the park including Warner Park Nature Center (WPNC), Percy Warner Golf Course, and the Harpeth Hills Golf Course.

The Warner Park Nature Center gourds were first installed in 2000 but did not have their first successful nest until 2010 - an indication of how important it is to be patient when attracting martins to a new breeding location.



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Scout arrival/phenology: The Purple Martin Conservation Association tracks first sightings of martins in the spring as part of the phenology of arrival to their nesting area. Each spring, we document the first arrival of Purple Martins to Warner Parks as they return from their wintering grounds in South America.

Table 1. Spring detection dates at WPNC

Year	1st Spring observed PUMA
2016	26 March
2019	26 March
2020	18 March
2021	10 March
2022	21 March
2023	08 March

Nest success: Measuring nest success helps to inform reproductive indices to better understand how populations are doing over time. In this area, Purple Martins begin to build their nests of grasses, weeds, sticks, and mud in spring. At WPNC, martins typically cover a completed nest with cherry leaves before the eggs are laid. We check nests weekly to document nesting activity; progression of the nest formation; number of eggs, nestlings, and fledglings. We band the nestlings when feasible. At the end of the season, all nest check data is submitted to the Purple Martin Conservation Association. See Table 2 for this year's results and Table 3 for results since 2000 when we began monitoring at WPNC.

We also monitored nests at three other locations, results in Table 2:

- In winter 2023, we installed a PUMA gourd system at the Harpeth Hills Golf Course which historically had nesting martins. While no martins nested, we did observe martins scoping out the nests in early spring. Kathy Shaw and Anne Hoos monitored this site.
- Ellington Agricultural Center. We began monitoring this site in 2022. Kathy Shaw monitored this site.
- Bells Bend Nature Center. We began monitoring this site in 2022. Krista Allen monitored this site.

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Banding, radio-tagging and post-fledgling behavior: We band martin nestlings on both legs: the left leg is banded with a U.S.G.S Bird Banding Laboratory uniquely numbered band, and the right leg is banded with a blue colored and numbered aluminum band. The colored bands help us to observe and identify birds after they fledge or if they return to the nesting area in subsequent years. The USGS bands help to identify the birds if they are recaptured or recovered at any location. Nestlings must be banded between 15-20 days of age when their legs are the correct size for the bands and before they can fly or fledge prematurely. Given this limitation, not all nestlings are banded to ensure they do not fledge prematurely.

Thanks to a donation from the Barbara J. Mapp Foundation, we continued our radio-tagging Motus research launched in 2021. At 20 days of age, martin nestlings from WPNC, Bells Bend, and Ellington Agricultural Center were fitted with Cellular Tracking Technologies 434 MHz Hybrid Lifetags using a legloop harness design. These radio-tags use solar technology to power the transmitter, allowing for multi-year detections.

Fledging and roost: From this research we have learned that recently fledged martins spend about a week in the area of their nest before joining larger, pre-migration roosts in the area. At night, martins aggregate in large numbers after breeding and before migrating south for the winter. One of the recent and biggest pre-migration roosts in our area has been in downtown Nashville for the past several years. Radio-tagged martins from our three locations have all joined this Nashville roost before migration.

Thanks to numerous partners and the 2 receiver stations located within Warner Parks, there are now 28 Motus receiver stations in Tennessee, including a temporary receiver station at the Bridgestone Tower in downtown Nashville. These stations significantly increase our chances of detection and improve our understanding of foraging behavior, roost behavior, and phenology of departure times.

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Warner Park Radio-tagging Summary

- 16 martin nestlings from 7 gourds were radio tagged from 19 June through 23 June
- We documented but did not band or radio-tag more nestlings because they were not the appropriate age (20 days old to attach a transmitter) or due to concern that lowering the gourds would cause premature fledgling in older nestlings.
- All radio-tagged nestlings were confirmed to have fledged. Two martins were detected by the WPNC after fledgling but then never detected by another station. One martin that we know fledged only transmitted on the day it was attached, so the status after fledging was unknown. One radio-tagged martin is presumed to have died sometime after fledging because of a detection on 12 Dec 2023 which is out of the range for when we would expect martins to be in the area.
- Half (8) of the radio-tagged fledglings from Warner Parks were detected at the Nashville migration roost between 14 July – 28 August 2023.
- 5 radio-tagged fledglings were super foragers, detected by at least 5 receiver stations in Middle Tennessee area.

Ellington Agricultural Center Radio-tagging Summary

- 5 martin nestlings from 2 gourds were radio tagged on 23 June and 27 June 2023
- We documented but did not band or radio-tag more nestlings because they were not the appropriate age (20 days old to attach a transmitter) or due to concern that lowering the gourds would cause premature fledgling in older nestlings.
- All radio-tagged nestlings were confirmed to have fledged. One martin that we know fledged was never detected by a receiver station (there is no receiver station at Ellington).
- 4 (80%) of the radio-tagged fledglings from Ellington were detected at the Nashville migration roost between 15 July – 27 August 2023.
- 3 of the Ellington radio-tagged fledglings were super foragers, detected by at least 5 receiver stations in Middle Tennessee area.
- One of 'super forager' martins (radio tag#4B19334) has been detected by 14 receiver stations. This bird spent its last day in our area on 22 August 2023, detected by the Harpeth Hills Golf Course and WPNC receiver stations. It was detected 35 days later 730am by the Kekoldi station (ID# 10045) near Puerto Viego de Talamanca on the east coast of Costa Rica, presumably on its journey to South America for the winter.

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Bells Bend Outdoor Center Radio-tagging Summary

- 4 martin nestlings from 2 gourds were radio tagged on 21 June and 27 June 2023
- We documented but did not band or radio-tag more nestlings because they were not the appropriate age (20 days old to attach a transmitter) or due to concern that lowering the gourds would cause premature fledgling in older nestlings.
- All radio-tagged nestlings were confirmed to have fledged. One martin that we know fledged was never detected by a receiver station (there is no receiver station at Bells Bend).
- 3 (75%) of the radio-tagged fledglings from Bells Bend were detected at the Nashville migration roost between 15 July – 14 August 2023.
- 3 radio-tagged fledglings were super foragers, detected by at least 5 receiver stations in Middle Tennessee area.

Table 2. Purple Martin productivity at three locations.

Location	# gourds occupied/available	# eggs	# hatched	# fledged	# radio-tagged	# banded
Warner Park Nature Center	11/24	55	53	52	16	32
Bells Bend Nature Center	6/12	33	32	32	4	14
Ellington Agriculture Center	4/23	23	14	12	5	9

Schermerhorn Symphony Roost: Purple Martins have historically roosted at various locations near the Cumberland River. The pre-migration roost in Nashville during 2020 and 2021 was estimated to be the largest documented in the area, at 150,000 birds. By radio-tagging martin nestlings, we have learned many of these nestlings born in the surrounding area join this big migration roost.

In 2022, the Symphony decided to cut down the roost trees in an attempt to redirect the Purple Martins elsewhere. The heavy pruning of right-of-way trees, playing of crow playback calls, and use of falconer were successful in deterring roost from the Symphony location. An initial roost formed at 914 2nd Avenue, and by mid-July 100,000 PUMAs roosted below Siegenthaler Pedestrian Bridge on 1st Avenue South.

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In 2023, the pre-migration roost was even larger with approximately 170,000 birds at its peak in mid-August, located at the right-of-way at Symphony Place. Trees that were heavily pruned in 2022 had grown back. During peak numbers, PUMAs used overflow trees at Walk of Fame and in front of Country Music Hall of Fame. Organized by Metro Parks staff, volunteers were present most nights to educate the public about the migration phenomena. The Nashville Downtown Partnership pressure washed the roosting areas 6 days per week to address public health concerns and no additional deterrents were employed.

Purple Martins in the news: Given the location of the martin roost in the core of downtown Nashville and the history with cutting down the roost trees, each year the martins continue to receive media attention. This year's media coverage included:

- [New York Times](#)
- [Axios](#)
- [WLPN](#)
- [WKRN](#)
- [WPLN](#)
- [NashToday](#)
- [The Tennessean](#)
- [The Tennessean](#)
- [U.S. Fish and Wildlife Service](#)

Looking ahead: Prompted by discussions of tree and roost removal in 2022, partners from The Nature Conservancy of Tennessee, the BIRD Program with Friends of Warner Parks, Metro Parks, Tennessee Wildlife Resources Agency, the Mayor's Office and Bird Safe Nashville brought interested parties together to apply for Nashville to receive designation as a U.S. Fish and Wildlife Service Urban Bird Treaty City. Nashville was granted the designation and is the first city in Tennessee and 31st in the country to receive the honor. This designation reflects a commitment for our city to be welcoming for birds and people by engaging in actions around conservation and habitat, reduction of hazards to birds, and public engagement and education.

With assistance from the BIRD Program, the Purple Martin Conservation Association installed a dual receiver Motus station (The Sitio # 10471) on the Rio Negro in Brazil. This island hosts one of the largest [wintering Purple Martin](#) roosts discovered. It is our hope that one of our radio-tagged Purple Martins will be detected there this year.

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Purple Martins are adaptable birds with strong associations with humans. Unfortunately, and typical of aerial insectivorous birds, martin populations have declined significantly. We hope that our research and public engagement helps to inform a better understanding and compassion for these birds. We have an opportunity with the Urban Bird Treaty Program to ensure Nashville provides habitat and reduces hazards to birds such as martins while ensuring communities and businesses can thrive. Please join us in these efforts.

Team effort: From monitoring the nests to radio-tagging martins to observing roosts, this was a significant team effort. Many thanks to the following:

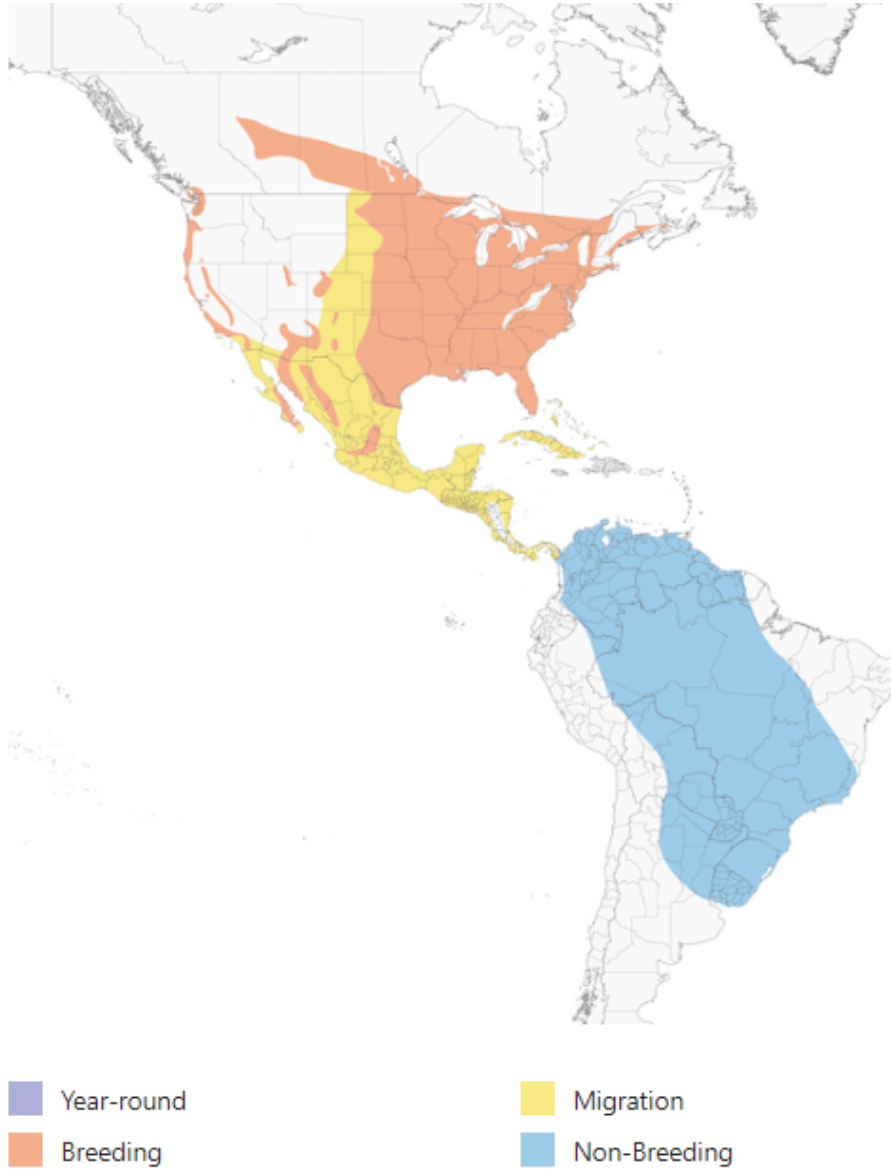
- Nest monitoring and radio-tagging: Kathy Shaw, Anne Hoos, Krista Allen, Lise Brown
- Receiver stations: Steve Ghertner, Terry Cook, Cory Holliday for equipment and station installation; Bridgestone for allowing us to place a temporary receiver station; The Nature Conservancy, the Tennessee Regional Motus Collaborative, the Nashville Zoo, Tennessee River Gorge Trust, University of Tennessee Chattanooga, Tennessee Wildlife Resources Agency, and Friends of Warner Parks/Nashville Metro Parks for their network of receiver stations throughout Middle Tennessee
- Education and Engagement at the roost: Jessa Tremblay with Nashville Metro Parks for leading the effort to engage the public at the downtown roost and to the many fabulous volunteers
- Funding for the BIRD Program, radio transmitters, and receiver stations: Friends of Warner Parks and Warner Park Nature Center, the Barbara J. Mapp Foundation.

Literature Cited

1. Brown, C. R., D. A. Airola, and S. Tarof (2021). Purple Martin (*Progne subis*), version 2.0. In *Birds of the World* (P. G. Rodewald, Editor). Cornell Lab of Ornithology, Ithaca, NY, USA. <https://doi.org/10.2173/bow.purmar.02>
2. Kenneth V. Rosenberg, Adriaan M. Dokter¹, Peter J. Blanche, John R. Sauer⁴, Adam C. Smith⁵, Paul A. Smith³, Jessica C. Stanton⁶, Arvind Panjabi⁷, Laura Helft¹, Michael Parr², Peter P. Marra. *Science* 04 Oct 2019: Vol. 366, Issue 6461, pp. 120-124, DOI: 10.1126/science.aaw1313

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Figure 1. Distribution of Purple Martins from *Birds of the World*.



Distribution of the Purple Martin

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Table 3. Warner Park Nature Center Purple Martin nest activity 2001-2023.

Year	# gourds available	# gourds with eggs	% occupancy (gourds with eggs)	# eggs	# hatched	% hatch from egg	# presumed fledged	% fledge from egg	% fledge from hatch	# radio-tagged	# banded
2000-2009	12	0	0%	0	0	0	0	0	0	0	0
2010	12	2	17%	10	9	90%	9	90%	100%	0	5
2011	12	2	17%	9	3	33%	3	33%	100%	0	3
2012	12	3	25%	18	15	83%	15	83%	100%	0	10
2013	12	0	0%	0	0	0%	0	0%	0%	0	0
2014	12	1	8%	4	4	100%	4	100%	100%	0	0
2015	12	2	17%	10	8	80%	8	80%	100%	0	8
2016	12	1	8%	3	3	100%	3	100%	100%	0	3
2017	12	2	17%	10	8	80%	8	80%	100%	0	8
2018	12	4	33%	4	4	100%	4	100%	100%	0	4
2019	12	3	25%	14	14	100%	13	93%	93%	0	14
2020	12	12	100%	58	53	91%	50	86%	94%	0	44
2021	24	12	50%	59	54	92%	51	86%	94%	6	30
2022	24	12	50%	56	47	84%	43	77%	91%	15	25
2023	24	11	46%	55	53	96%	52	95%	98%	16	32
Totals				310	275	81%	263	79%	91%	37	186

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Left to right: Volunteer Cody Cook searches for radio-tagged Purple Martins at the Nashville roost by Laura Cook. WPNC Bird team Kathy Shaw, Sandy Bivens and interns, Anna Sawyer and Amelia Browning, radio-tag 20-day old PUMA nestlings by Laura Cook. The Nashville PUMA roost by Terry Cook. The Nashville PUMA roost by Lindsay Hanna. The Bridgestone Motus receiver station by Laura Cook. A 20-day PUMA nestling with its new radio-transmitter by Laura Cook.