

Figure 2. American Redstart 2260-04849, banded in Santo Domingo on February 10, 2021, being processed by Michael Corcoran on May 11 at Birdcraft Museum and Sanctuary, Fairfield, Connecticut. Photo by Christine Penney.



Acknowledgements

Thanks to Judy Richardson, Patty Scott, and Michael Corcoran of Connecticut Audubon's Birdcraft Museum and Sanctuary, and Alison Olivieri of the San Vito Bird Club, for sharing in their excitement of discovery. Thanks, too, to Dr. Wayne Arendt of the USFS, as well as Danilo Mejía, and Luis and Maria Paulino of Grupo Acción Ecológico, for their many contributions to bird banding in the Dominican Republic. Steven Latta was supported by the Avian Conservation Endowment of the National Aviary. Wayne Arendt and his field team conduct research as part of the Santo Domingo ULTRA (Urban Long-term Research Area) joint research and educational

program, part of an interdisciplinary consortium including IITF/International Cooperation and Wildlife Ecology programs, USAID/DR, and several local universities under a PAPA No. AEG-T-00-07-00003-00 agreement. Finally, thanks to Bob Mulvihill for comments on an earlier draft of this report.

The Chimney Swift in the Southeastern United States: Historic Banding and Future Research

Scott Rush

Department of Wildlife, Fisheries & Aquaculture
Mississippi State University
Mississippi State, MS 39762

Lianne Koczur

Alabama Audubon
3720 Fourth Avenue South
Birmingham, AL 35222

Chimney Swifts (*Chaetura pelagica*) have been the focus of long-term and large-scale banding efforts as well as continent-wide citizen science monitoring efforts. A significant amount of information on individual movements and habitat use was obtained through these efforts. However, there are several aspects of the species' biology that need further study (Steeves et al. 2020). Herein we provide a brief overview of Chimney Swift habitat use and migration and discuss changes in landscapes that may have influenced the species and their migrations in the southeastern United States. We also discuss how bird banding has been used as a tool to learn more about Chimney Swifts, including extensive banding operations carried out throughout the United States during the 1930s. Lastly, we discuss how the southeastern United States is positioned as a key area through which we can learn about Chimney Swifts, their populations and demographics with the goal of furthering conservation of this species and the resources they provide.

Despite their specific epithet '*pelagica*', this name is likely not related to marine aspects for these birds but rather reflects the wandering behavior exhibited by them. This point aside, evidence indicates these birds are trans-gulf migrants, crossing the Gulf of

Mexico in fall (Steeves et al. 2020). In staging for these fall trans-gulf journeys, roosts containing thousands of these birds overnighing in single chimneys within areas close to the northern Gulf of Mexico are not uncommon. Chimneys that support large congregations of these birds during the fall were clearly not always components of these landscapes. Rather, Chimney Swifts historically likely made use of hollow trees, and to a lesser extent rock crevices and caves and crevices throughout their migratory pathways (Graves 2004). Specific to the southeastern United States, where vast areas once supported wetlands interspersed with bald cypress (*Taxodium distichium*) and other hardwoods prone to hollow boles, Chimney Swifts, before extensive European settlements, likely made use of these trees as congregation sites during migration. These large, hollow trees were emblematic of the wetland systems dominating extensive portions of this geographic region and later converted to other land types with forests of older trees removed as the Southeast experienced increasing development and industrial growth. As these landscapes changed, towering trees with hollow trunks were replaced by chimneys. Chimney Swifts may have responded to these changes by taking advantage of these novel features available to them. Subsequently, the migration pathways that Chimney Swifts use, with mass gatherings in fall along the Northern Gulf of Mexico have likely changed little through time.

Industrious Chimney Swift banding efforts were undertaken during the early to mid-1900s following calls from various ornithological associations for information leading to greater insight of migration activity between birds moving between North and South America during the breeding and non-breeding season.

For instance, 71,623 Chimney Swifts were reported to the Bird Banding Laboratory in 1939, 38,821 banded in 1940, and 41,487 banded in 1941 (USFWS 1941; USFWS 1942). This effort coincided with the recovery of banded Chimney Swifts overwintering in Peru (Coffey 1944). While the birds recovered in Peru were initially captured in several states in the United States, and in Ontario, Canada (see Coffey 1944), the majority were banded at stopover sites in the southeastern United States during fall migration, including locations in Alabama, Georgia, and Tennessee. That these birds were banded at locations within these states highlights Chimney Swifts' migratory behavior where birds mass at locations in the lower Mississippi Valley before crossing the Gulf of Mexico (Steeves et al. 2020). Band-recapture programs have also shown Chimney Swifts migrate along flyways (Table 1, 2, Fig. 1), with some changes in flyways occurring among migrations. Many of the flyways used in fall converge in the southeastern United States (Fig. 1).

Recoveries within and without State and Providence where banded State		Recoveries within State and Providence where banded	
State	Count	State	Count
Tennessee	10,263	Tennessee	9,538
Georgia	5,403	Georgia	5,206
Missouri	2,749	Missouri	2,762
Ontario	1,712	Ontario	1,719

Table 1. Top US states and Canadian province as origins of recoveries of Chimney Swifts from 1921-2018. Banding/recapture-recovery information provided by Bird Banding Laboratory.

Banding Flyway	Encounter Flyway			
	Atlantic	Mississippi	Central	Canada
Atlantic	6,997	270	21	124
Mississippi	558	16,507	99	188
Central	5	25	51	0
Canada	72	131	3	1,518

Table 2. Number of Chimney Swift banded and recaptured or recovered by flyway as defined by the Bird Banding Laboratory. Flyway of initial capture noted along vertical axis. Flyway of recapture/recovery noted along horizontal axis.

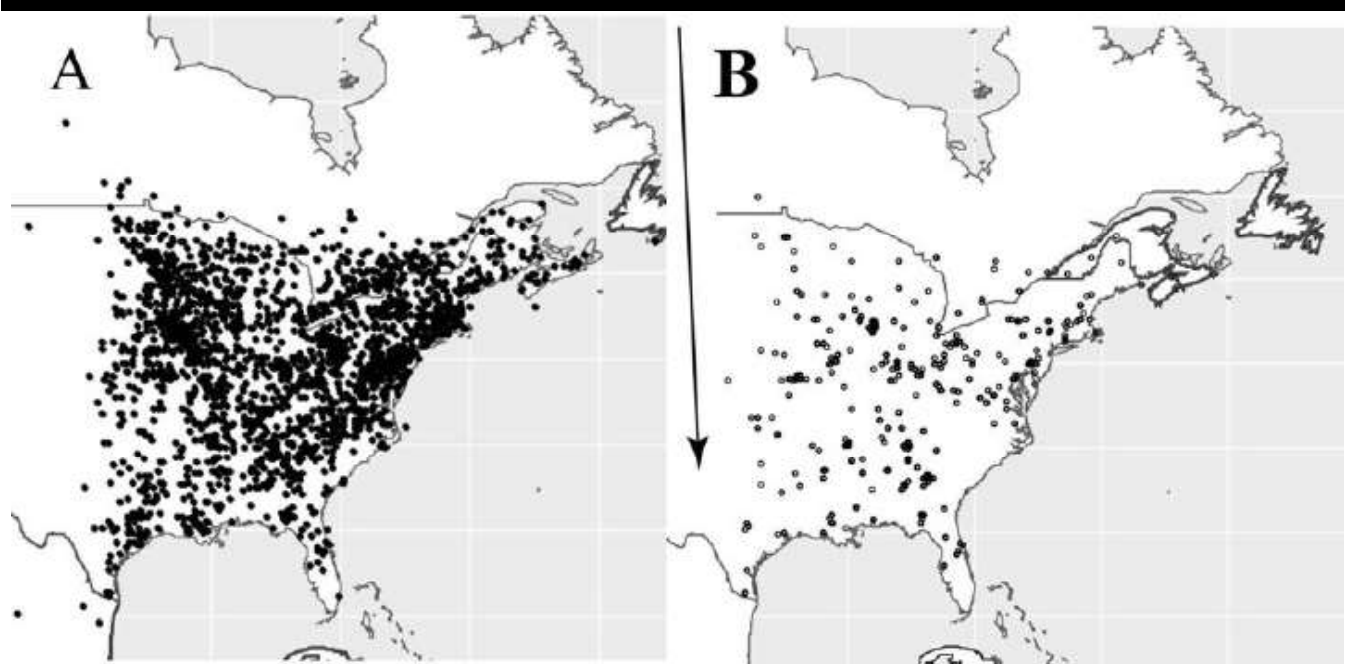


Figure 1. Banding and recapture locations for 26,594 records received by the Bird Banding Laboratory from 1921 to 2018. A – banding locations. B – recapture locations. Birds recovered outside of North America are not shown. Arrow between plots shows absolute value in degrees difference between location of banding and recapture/recovery in the fall. Bearing angle between these points (179°) was determined using a function in Program R.

Because of the large congregations of Chimney Swift in fall, several major studies on Chimney Swift dispersal have centered on the southeastern United States, especially to areas along the northern Gulf of Mexico. For instance, Lowrey (1943) described the dispersal of over 21,000 Chimney Swifts banded or recovered in Baton Rouge, Louisiana, between 1937 and 1939. Other notable banding efforts include over 35,000 birds banded in Memphis, Tennessee, between 1932 and 1943, 24,000 Chimney Swifts banded during this same period in Nashville, Tennessee, over 27,000 banded in Macon, Georgia, and over 21,500 in Opelika, Alabama, during this same time interval (Coffey 1944). These efforts made use of a variety of different trap types (Green 1930, Peters 1937), usually consisting of a box placed over the chimney, a box outfitted with a window that allows light penetration into the trap, and a shoot down to a collection bag from which birds can be removed and processed. Although these large-scale banding efforts were carried out more than 90 years ago, Chimney Swifts continue to make mass migrations through these southern cities and some banding continues. During Sep - Oct 2015 - 2017 we banded 275 Chimney Swifts using a Jan. - Mar.

single chimney on the campus of Mississippi State University. Of these banded birds, one banded in Oct. 2017 was recovered on a windowsill in Cleveland, Ohio, in June 2018.

While the path of Chimney Swift migrations has not likely changed, evidence suggests the number of Chimney Swifts in North America has been reduced considerably over the last 40 years. Breeding Bird Survey data indicate a 70% decline in the occurrence of this species per route from the early 1970s through 2020 (Pardieck et al. 2020). Explanations for these losses remain controversial with hypotheses posited to loss of chimney roost sites through capping activities to losses in aerial insect abundance and diversity throughout North and South America (Fitzgerald et al. 2014; Raven and Wagner 2021). Whatever the causal agent, or suite of factors behind these declines, Chimney Swift populations are apparently in trouble. Emerging technologies such as fixed-position detection systems like MOTUS (Motus Wildlife Tracking System), and other tracking tools that can be employed on birds can yield increasingly precise information on where and when birds move and where they spend various periods of

their annual life cycle when they are not actively migrating. Information obtained through these systems can also give detail on demographics that can differ among populations and other categorical considerations such as the sex and age of the birds tracked. Given the movement of Chimney Swifts through the southeastern United States during migration this geographic area can act as a major research base to provide information on this species, their movements and population demographics. Such efforts should also expand to international collaboration involving banders throughout the Caribbean, Central, and South America and should employ newer technologies as well as holistic approaches that include sampling endo- and ecto-features of these birds, as well as the unique biomes that exist on and within them.

LITERATURE CITED

- Coffey Jr, B. B. 1944. Winter home of Chimney Swifts discovered in northeastern Peru. *The Migrant* 15: 37-38.
- Fitzgerald, T.M., E. van Stam, J. J. Nocera and D. S. Badzinski. 2014. Loss of nesting sites is not a primary factor limiting northern Chimney Swift populations. *Population Ecology* 56: 507-512.
- Graves, G. R. 2004. Avian commensals in Colonial America: When did *Chaetura pelagica* become the Chimney Swift? *Archives of Natural History* 31: 300-307.
- Green, W. R. 1930. Chimney Swift banding operations at Chattanooga. *Wilson Bulletin* 42: 110-118.
- Lowery, G. H. 1943. The dispersal of 21,414 Chimney Swifts banded at Baton Rouge, Louisiana, with notes on probable migration routes. *Proceedings of the Louisiana Academy of Sciences* 7: 56-74.
- Pardieck, K. L., D. J. Ziolkowski Jr., M. Lutmerding, V. I. Aponte and M.-A. R. Hudson. 2020. North American Breeding Bird Survey Dataset 1966 – 2019: U.S. Geological Survey data release, <https://doi.org/10.5066/P9J6QUF6>.
- Peters, H. S. 1937. Chimney Swift banding in Alabama during the fall of 1936. *Bird-Banding* 8: 16-24.

- Raven, P. H., and D. L. Wagner. 2021. Agricultural intensification and climate change are rapidly decreasing insect biodiversity. *Proceedings of the National Academy of Sciences* 118: e2002548117
- Steeves, T. K., S. B. Kearney-McGee, M. A. Rubega, C. L. Cink and C. T. Collins. 2020. Chimney Swift (*Chaetura pelagica*), version 1.0. In *Birds of the World* (A. F. Poole, ed.). Cornell Lab of Ornithology, Ithaca, NY. <https://doi.org/10.2173/bow.chiswi.01>
- U.S. Fish and Wildlife Service. 1941. *Bird Banding Notes* : 26-55.
- U.S. Fish and Wildlife Service. 1942. *Bird Banding Notes* : 57-66.
- Wheeler, H. E. 2013. Foraging patterns of breeding Chimney Swifts (*Chaetura pelagica*) in relation to urban landscape features. M.S. thesis, Trent University, Peterborough, ON.



Chimney Swift (*Chaetura pelagica*)
Can Stock Studio