



Landbird Community Monitoring: 2022 Data Summary

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Overview

Birds play multiple critical roles in park ecosystems, where they occupy and interact with multiple levels of the food web. Predatory birds regulate prey species populations, notably helping to control rodents and insects. Scavenging species remove dead animals from the environment. Many other bird species act as important pollinators or seed dispersers. Because many avian species are associated with specific habitat types and ecosystem services, we can gain insights about the condition of specific habitat components in a park by monitoring what birds are present and where in the landscape they occur.

The many active members of the recreational birding community enjoy opportunities to engage in bird and wildlife watching in protected park settings. Birds contribute beauty and song to the natural setting and provide great appeal to the public. Birding has become one of the most popular outdoor recreational activities pursued by Americans. Birders substantially contribute to local economies while pursuing their hobby.

The Southeast Coast Network (SECN) parks - located in Alabama, Florida, Georgia, South Carolina, and North Carolina - are mainly located within the Atlantic Flyway, and host high avian species richness. More than 400 avian species use SECN parks while breeding, wintering, or stopping over during migration (NPS 2025). Surrounded by human-altered landscapes in a region of increasing urbanization and land conversion, the inland and coastal parks of the SECN represent important, ecologically-intact areas that contain a multitude of habitat types important to the conservation of wildlife.

Bird communities respond quickly to environmental stressors. Changes in avian species composition, richness, and distribution on the landscape may indicate changes in the underlying ecological condition of park resources. Shifting species distributions alter species interactions and the food-web structure, thereby producing cascading effects on ecosystem processes (Montoya and Raffaelli 2010). Long-term monitoring projects can potentially detect trends in breeding bird populations and use them to assess ecosystem integrity and sustainability. Park managers can use monitoring data as a tool to inform land management decisions.



Red-bellied woodpecker (*Melanerpes carolinus*), one of numerous species detected during monitoring in 2022. NPS / Jane Gamble

Objectives

This report summarizes data collected with the SECN landbird community monitoring protocol (Byrne et al. 2014) to address the following Vital Signs Monitoring Program objectives:

1. Evaluate landbird community species richness in the park during the breeding season.
2. Assess landbird occupancy and spatial distribution in the park during the breeding season.

We use the term “community” herein to refer to an assemblage of species populations occurring together in time and space (Begon et al. 1986). We consider the vocal avian species assemblage within the park as a de facto community (Byrne et al. 2014).

Significant Results

This brief summarizes data collected in 2022 at Congaree National Park during implementation of the Southeast Coast Network’s Landbird Community Monitoring Protocol.

- Automated recording devices captured landbird vocalizations from March 14 to June 14 at 17 spatially-balanced random sampling locations.
- A subset of 1,020 minutes of audio derived from 85 recordings was analyzed and all discernable bird vocalizations were reviewed and classified to species.
- We detected 69 species of native landbirds in 2022 under our monitoring protocol. Two additional nocturnal species were detected incidentally during a concurrent project. We did not detect any introduced species. All species were previously documented in the park.

Significant Results (continued)

- The most frequently-detected species were yellow-billed cuckoo (*Coccyzus americanus*), red-bellied woodpecker (*Melanerpes carolinus*), pileated woodpecker (*Dryocopus pileatus*), red-eyed vireo (*Vireo olivaceus*), tufted titmouse (*Baeolophus bicolor*), blue-gray gnatcatcher, (*Poliophtila caerulea*) and Carolina wren (*Thryothorus ludovicianus*), which were detected at 100% of sampling locations. Additionally, barred owl (*Strix varia*), American crow (*Corvus brachyrhynchos*), northern parula (*Setophaga americana*), northern cardinal (*Cardinalis cardinalis*), white-eyed vireo (*Vireo griseus*), and summer tanager (*Piranga rubra*) were detected at greater than or equal to 88% of sampling locations.
- Next scheduled sampling year is 2025.

Visit the NPS data store at the Integrated Resource Management Application portal for:

- [Data summary brief](https://irma.nps.gov/DataStore/Reference/Profile/2313657) (https://irma.nps.gov/DataStore/Reference/Profile/2313657)
- [Species distribution maps](https://irma.nps.gov/DataStore/Reference/Profile/2313658) (https://irma.nps.gov/DataStore/Reference/Profile/2313658)
- [Full dataset and metadata](https://irma.nps.gov/DataStore/Reference/Profile/2307457) (https://irma.nps.gov/DataStore/Reference/Profile/2307457)

Study Area

Congaree National Park (formerly Congaree Swamp National Monument) is located in central South Carolina approximately 30 kilometers (18.6 miles) southeast of the state capital, Columbia. The 10,802-hectare (26,693-acre) park is bordered to the south by the Congaree River and the Wateree River to the east. The park contains the largest contiguous old-growth bottomland hardwood forest remaining in the United States. The park represents a unique and uncommon assemblage of aquatic and terrestrial plant and wildlife community types.

Congaree National Park is predominantly in floodplain forest with nearly 90 native tree species, including many recognized as national and state champions for their size. A wide variety of forest communities occur at the park, with dominant tree species ranging from upland pines (*Pinus* spp.) to wetland cypress (*Taxodium* spp.) and tupelo (*Nyssa* spp.) often occurring with ubiquitous species such as sugarberry (*Celtis laevigata*), sweetgum (*Liquidambar styraciflua*), and laurel oak (*Quercus laurifolia*).

Episodic and seasonal inundations in surface water are a critical component of the integrity of the park's floodplain forest. The frequency, magnitude, and duration of flooding events are primary drivers for many of the vegetation communities and serve as mechanisms for the delivery of sediment and nutrients to the floodplain. Although periodic inundations continue to occur, the regulated flow of water through the park since the introduction of the



Yellow-billed cuckoo (*Coccyzus americanus*), one of numerous species detected during monitoring in 2022. NPS photo / Macaulay Library, CLO, Benjamin Murphy (NPGallery).

Saluda Dam in 1930 does not follow seasonal hydrologic fluctuations or represent a natural (i.e., historic) hydroperiod. The effects of this alteration on the floodplain ecosystem remain unknown.

Congaree National Park had 193 previously documented landbird species when sampling occurred in 2022 (NPS 2025). A table listing all avian species documented on NPSpecies (NPS 2025), as well as avian species documented during SECN's 2022 monitoring, is available in Appendix A.

Methods

Sampling Design

The Southeast Coast Network established a randomly-selected, spatially-balanced set of sample locations ($n = 32$) during an initial field season in 2014 (Figure 1). Our sample size was chosen based on considerations that included park size, hypothesized variability in wildlife populations, and logistics. Sample locations are permanent and are revisited on a three-year rotation. This report pertains to 2022 sampling only. More comprehensive details regarding study design, data collection, and data analyses can be found in the SECN Landbird Community Monitoring Protocol (Byrne et al. 2014).

Data Collection

In 2022, we deployed automated recording devices (ARDs) at 20 of 32 permanent audio sampling locations within Congaree National Park in 2022 (Figure 1) from March 14 to June 14. Three units subsequently experienced environmental damage, reducing the number of sampled sites to 17. We programmed each ARD to record audio from 08:00 to 08:12, every other day during the monitoring period. The ARDs were collected from the field after recordings were completed and recordings were downloaded to a computer for classification and analyses.



Audio Sampling Locations

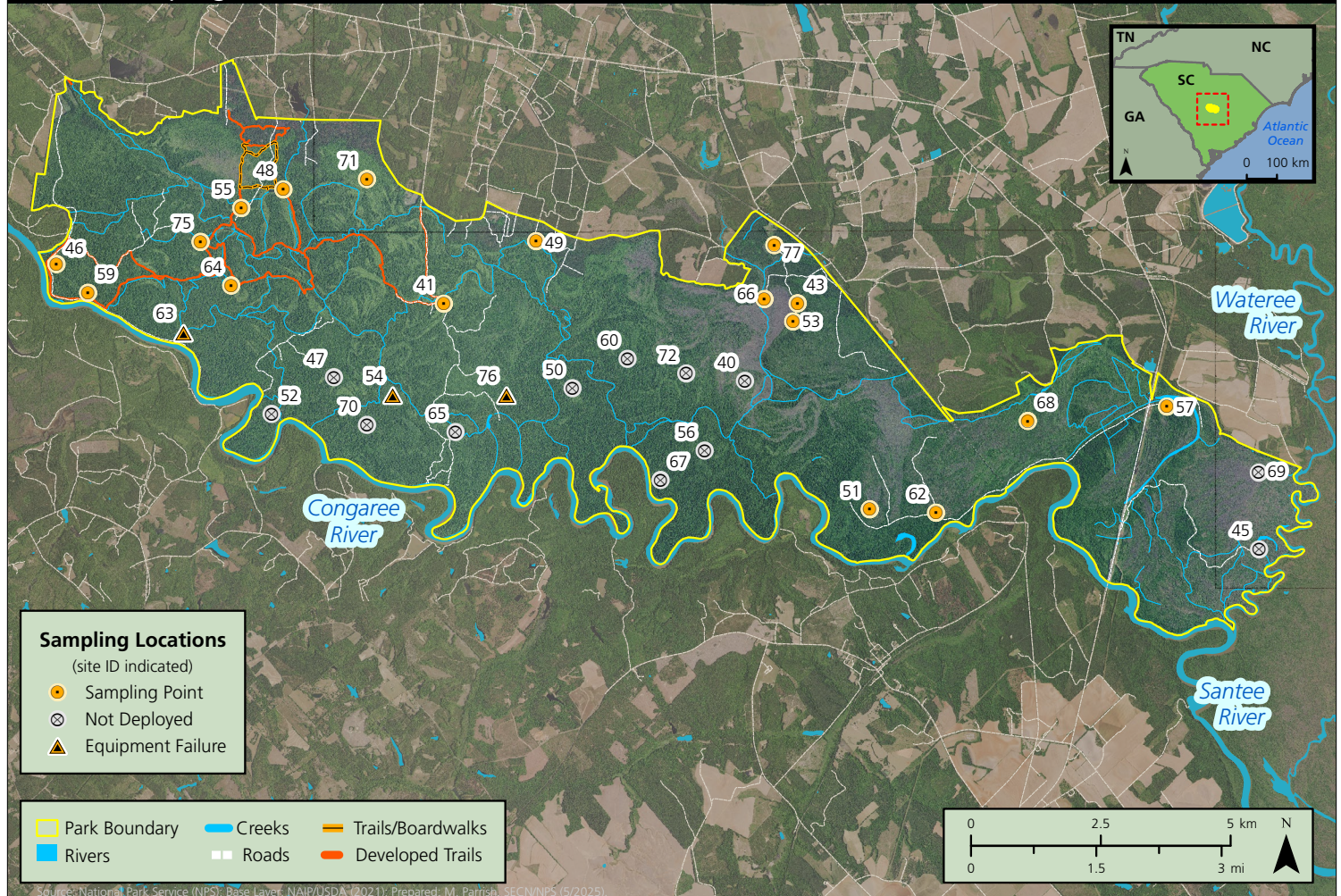


Figure 1. Automated recording devices (ARDs) were deployed at 20 of 32 permanent audio sampling locations within Congaree National Park in 2022. Three units subsequently experienced environmental damage, reducing the number of sampled sites to 17. Sampling location ID numbers are indicated at each point.

Methods (continued)

Manual Classification of Recordings

We systematically selected recordings from the following dates: April 1, April 15, April 30, May 15, and May 30. Loud ambient noise (e.g., traffic, surf, insect droning, or wind) in recordings negatively affects discernment of wildlife vocalizations. Thus, recordings made on the above dates were initially screened using the software package Kaleidoscope Pro (Wildlife Acoustics, Inc. 2025) to assess clarity and determine whether background noise was disruptive to the listener's ability to interpret bird sounds. If recording quality was poor on a given date, we systematically evaluated and selected for analysis alternate recordings from proximate dates.

Selected recordings were methodically reviewed by an experienced technician with strong familiarity with the vocalizations of birds of the southeastern US. The technician evaluated recordings using Kaleidoscope Pro, which allowed them to view spectrograms (graphical representations of vocalizations) and to manipulate

playback on the fly to maximize acoustical clarity. The technician classified all vocalizations identifiable to the species level, a process requiring from one-half to two hours per 12-minute recording depending on the complexity of the captured soundscape. A wildlife biologist later reviewed the technician's classifications for data quality assurance and control.

Taxonomic Standards

Our use of taxonomic nomenclature followed the American Ornithological Society Check-list of North American Birds (Chesser et al. 2024). Herein, we refer to bird species according to their standard common names; for scientific names, please refer to Table A1 in Appendix A. The National Park Service maintains the online database NPSpecies (NPS 2025), which documents the occurrence and status of species found in parks.

Methods (continued)

Data Analysis

The focus for this effort was limited to the analysis of species richness and related characteristics, including occupancy and spatial distribution of the park's breeding-season landbird community. We derived results from our manual evaluation of 1,020 minutes of audio from 85 recordings across 17 sample locations. We only included in analyses detections of birds that were identified to the species level. We calculated metrics separately for native versus non-native species, as managers may extend the latter special consideration.

Species Richness and Composition

Using the SpadeR package (Chao et al. 2016) in program R, we calculated species richness for the park as well as mean species richness per sample location at the sample location scale, as well as at the park scale. Species richness was defined as the number of unique species detected at the scale of interest.

Field methods for sampling species richness (e.g., point-counts or audio sampling) inherently produce incomplete counts, due to imperfect detection of cryptic species that may be present but are difficult to record during surveys. Observed species richness, therefore, is expected to be an underestimate of true species richness, though it offers utility as an index of the true richness of a sample unit. Various methods exist to adjust incidence data to provide an estimated species richness that may be closer to the true value. We used the SpadeR package in R to calculate the *iChao2* estimator of species richness with an associated 95% confidence interval (Chiu et al. 2014). The *iChao2* estimator uses the detection frequencies of rarely-detected species to adjust the observed richness upward to account for species that may be present but not detected. The *iChao2* estimator is expected to perform well for communities that are highly heterogeneous with regard to species incidence or occupancy (Chiu et al. 2014).

Incidental Detections of Nocturnal Birds

Concurrently with this study, we conducted overnight anuran monitoring at the same set of sampling locations. Incidental to anuran observations, we frequently detected several species of nocturnal bird species, including owls and nightjars. We do not currently survey nocturnal avian species in a systematic way. Herein, we report them separately as incidental observations and provide occupancy maps for the sake of completeness, but we do not include these detections in calculations of richness and occupancy because they are not systematically surveyed. Should a nocturnal bird be detected as part of our landbird monitoring protocol, however, we do include it in analyses as usual.

Occupancy

We calculated naïve occupancy (i.e., frequency of occurrence) as the percent of sampling locations where a species was detected in one or more reviewed recordings. We did not adjust occupancy estimates for probability of detection (i.e., detectability). Species with greater naïve occupancy occur at more locations than those with low values.



Red-eyed vireo (*Vireo olivaceus*), one of numerous species detected during monitoring in 2022. NPS photo / Macaulay Library, CLO, Gordon Dimmig (NPGallery).

Spatial Distribution

We mapped species detections in the park to provide a means of visually assessing spatial distributions of vocal birds. An understanding of landbird distribution is crucial for informed management of species and their requisite habitats. Following future park visits, we plan to examine species records across time to identify trends in community makeup and species distribution. This has potential to provide insights into influences on park resources (e.g., land use change and habitat condition, climate issues, and hydrological processes).

Results

Species Richness

Observed species richness of native breeding landbirds at the park in 2022 was 69 (Table 1, Table A1 in Appendix A). Mean $\pm$ SD observed species richness of native birds per sample location was 27.1 ± 3.3 (range: 21–35; Figure 2, Table 1). We detected no introduced species. We detected no previously undocumented species (NPS 2025). The *iChao2* species richness estimate for native species in the park was 87.5 (95% CI: 78.2, 106.3).

Occupancy and Spatial Distribution

Naïve occupancy was greatest for yellow-billed cuckoo, red-bellied woodpecker, pileated woodpecker, red-eyed vireo, tufted titmouse, blue-gray gnatcatcher, and Carolina wren, which were detected at 100% ($n = 17$) of sampling locations (Table 1, Table 2). American crow, northern parula, northern cardinal, white-eyed vireo, and summer tanager were also frequently detected, occurring at approximately 88% to 94% of sampled locations (Table 1, Table 2). If incidental nocturnal occupancy records for barred owl are included (see section below), barred owl naïve occupancy was 94.1%. Approximately 56.5% of species were infrequently detected; 39 species were detected at less than or equal to 30% ($n \leq 5$) of sample locations. Seventeen of the 39 species were detected at only one sample location (Table 1, Table 2).



Species Richness at Sampling Location

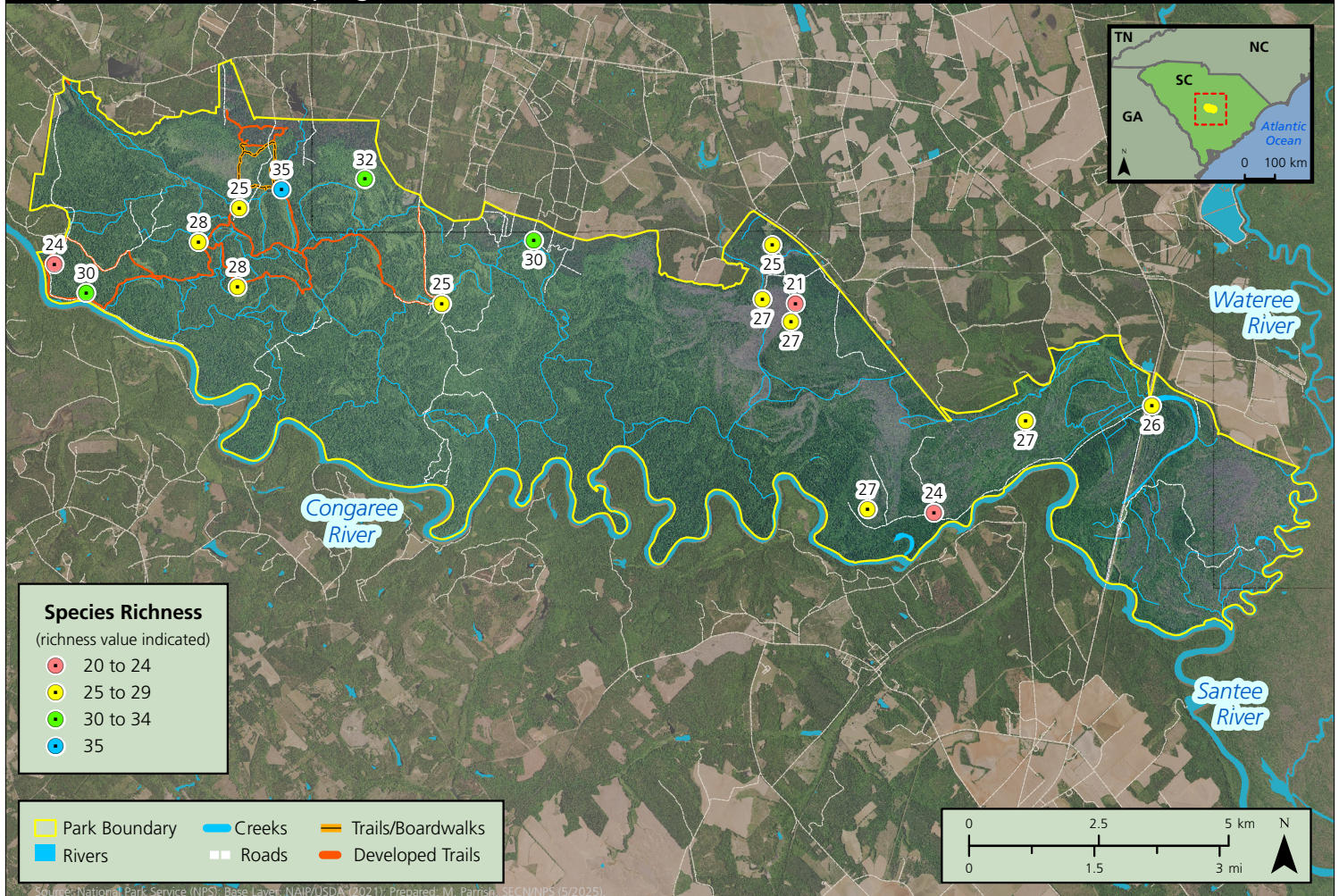


Figure 2. Landbird species richness at $n = 17$ sampling locations within Congaree National Park, based on audio recording detections in 2022.

Results (continued)

Incidental Detections of Nocturnal Birds

Concurrently with this study, we conducted overnight anuran monitoring at the same sampling locations using the same ARDs, which recorded wildlife vocalizations occurring between 20:00 and 05:00. Incidental to those anuran observations, we frequently detected several nocturnal bird species, which we include here for completeness: barred owl, Chuck-will's-widow, and eastern whip-poor-will (Table 1). Barred owl was frequently detected during our diurnal bird monitoring protocol discussed above, but our nocturnal observations increased the overall number of points with barred owl observations. With the inclusion of nocturnal observations, barred

owl naïve occupancy increased to 94.1%. The two caprimulgid species were not detected at all during diurnal sampling, which suggests that incorporating nocturnal bird sampling into future monitoring would improve occupancy estimates. Eastern whip-poor-will and Chuck-will's-widow are both infrequently reported in the park and our detections expand the areas in Congaree National Park where the two species are documented to occur.

Species Distribution Maps

Distribution maps for all detected species are available from the NPS data store at [Species Distribution Maps](https://irma.nps.gov/DataStore/Reference/Profile/2313658) (<https://irma.nps.gov/DataStore/Reference/Profile/2313658>). Distribution maps for these three nocturnal species are included with those from the present study (Figures 1 to 71 in Species Detection Maps).

Table 1. Landbird species detections (indicated with “X”) and observed species richness at each sampled location ($n = 17$) within Congaree National Park in 2022. Three nocturnal species were incidentally detected during overnight anuran sampling under a separate protocol. We include them for completeness, but those records are not included in statistical summaries in this table or in the report. Refer to Figure 1 for labeled sampling location ID numbers.

Common Name	41	43	46	48	49	51	53	55	57	59	62	64	66	68	71	75	77
Wood duck	–	–	–	X	X	–	–	–	–	–	–	X	–	X	–	X	–
Wild turkey	–	–	–	–	X	–	X	–	–	X	X	–	–	–	X	–	–
Mourning dove	–	–	–	X	X	X	–	–	–	–	X	–	–	–	X	–	X
Yellow-billed cuckoo	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Chuck-will's-widow (incidental ¹)	–	–	–	X	X	–	–	–	–	–	–	–	–	–	–	–	X
Eastern whip-poor-will (incidental ¹)	–	X	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–
Chimney swift	–	–	–	–	–	X	–	–	–	–	–	–	X	–	X	–	X
Ruby-throated hummingbird	–	–	–	X	X	–	X	X	–	–	–	–	–	X	–	–	–
Green heron	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Great blue heron	–	–	–	–	–	–	–	–	–	X	–	X	X	X	–	X	–
Cooper's hawk	–	–	–	–	–	–	–	–	–	X	–	–	–	–	–	–	–
Red-shouldered hawk	X	X	X	X	–	–	X	X	–	X	X	X	X	–	X	–	–
Red-tailed hawk	–	–	–	–	–	–	–	X	–	–	–	–	–	–	–	–	–
Barred owl	X	X	–	X	X	X	X	–	–	X	X	X	X	–	X	X	X
Barred owl (incidental ¹)	X	X	X	X	X	–	–	–	X	X	–	X	X	X	–	–	X
Belted kingfisher	–	–	–	–	–	X	–	–	–	–	–	–	–	–	–	–	–
Red-headed woodpecker	–	–	X	X	X	X	–	–	–	X	–	X	–	–	–	X	–
Red-bellied woodpecker	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Yellow-bellied sapsucker	–	–	X	–	–	–	–	–	–	–	–	–	X	–	–	–	–
Downy woodpecker	X	X	–	–	–	X	X	X	–	X	–	X	X	X	X	–	–
Hairy woodpecker	X	–	–	–	–	–	–	–	–	–	–	–	–	X	–	–	–
Northern flicker	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–	X	–
Pileated woodpecker	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Great crested flycatcher	–	X	X	X	X	X	–	X	X	X	X	X	X	–	X	–	X
Eastern wood-pewee	–	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–	–
Acadian flycatcher	–	–	X	X	X	X	X	–	X	X	–	X	X	–	X	X	X
White-eyed vireo	X	X	X	X	X	X	X	X	X	X	X	X	–	X	–	X	X
Yellow-throated vireo	–	–	–	X	X	–	–	X	–	–	–	–	X	–	X	–	–
Blue-headed vireo	X	–	–	–	–	–	–	–	–	X	X	X	–	–	–	X	–
Red-eyed vireo	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Blue jay	–	–	–	X	X	X	X	–	–	–	–	–	–	–	X	–	X
American crow	X	X	X	X	–	X	X	X	X	X	X	X	X	X	X	X	X
Fish crow	–	–	–	–	–	–	–	–	X	X	–	–	–	–	–	–	–
Carolina chickadee	X	X	X	X	X	X	X	X	X	–	X	–	X	X	X	X	–
Tufted titmouse	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Purple martin	–	–	–	–	–	–	–	–	–	–	–	–	X	X	–	–	–
Ruby-crowned kinglet	X	X	X	X	X	–	X	X	X	X	–	X	–	X	–	X	–
White-breasted nuthatch	–	–	–	–	X	–	–	X	–	–	–	X	X	–	X	X	–
Brown-headed nuthatch	–	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–	–
Blue-gray gnatcatcher	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Carolina wren	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Gray catbird	–	–	X	X	–	–	–	–	X	–	–	–	–	–	–	X	X
Brown thrasher	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Eastern bluebird	–	–	–	–	–	–	–	–	–	–	–	–	X	–	–	–	X

Table 1 (continued). Landbird species detections (indicated with “X”) and observed species richness at each sampled location (n = 17) within Congaree National Park in 2022. Three nocturnal species were incidentally detected during overnight anuran sampling under a separate protocol. We include them for completeness, but those records are not included in statistical summaries in this table or in the report. Refer to Figure 1 for labeled sampling location ID numbers.

Common Name	41	43	46	48	49	51	53	55	57	59	62	64	66	68	71	75	77
Hermit thrush	–	–	–	–	–	X	–	–	X	–	–	X	–	X	X	X	–
Pine siskin	–	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–	–
American goldfinch	–	–	–	–	X	–	X	–	–	X	–	–	X	X	–	X	–
White-throated sparrow	–	–	–	–	–	–	–	X	–	X	–	–	–	–	–	–	–
Eastern towhee	–	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–	–
Baltimore oriole	–	–	–	X	–	–	–	–	–	–	–	–	–	–	–	–	–
Brown-headed cowbird	–	X	X	X	X	–	X	–	–	X	–	X	X	X	X	–	–
Common grackle	–	X	–	–	X	–	X	–	–	–	–	–	–	X	–	–	–
Ovenbird	X	–	–	X	–	–	–	–	X	–	–	–	–	–	–	–	–
Louisiana waterthrush	–	–	–	–	–	–	–	–	–	–	–	–	–	–	X	–	–
Blue-winged warbler	–	–	–	–	–	–	–	–	–	–	X	–	–	–	–	–	–
Black-and-white warbler	–	–	–	–	–	X	–	–	–	–	X	–	–	–	X	X	X
Prothonotary warbler	–	–	X	–	–	X	X	–	X	X	X	X	X	X	X	–	–
Swainson's warbler	–	–	–	–	–	–	–	–	X	X	–	–	–	–	–	–	X
Orange-crowned warbler	–	–	–	–	–	–	–	–	X	–	–	–	–	–	–	–	–
Kentucky warbler	X	–	–	–	–	–	–	–	–	–	X	–	–	–	–	–	–
Hooded warbler	X	X	–	X	X	X	X	–	X	–	–	X	–	–	X	X	X
American redstart	–	–	–	–	–	X	X	–	–	–	X	–	–	–	–	–	–
Northern parula	X	–	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Blackpoll warbler	–	–	–	–	–	–	–	–	–	–	–	–	–	X	–	–	–
Black-throated Blue warbler	–	–	–	–	–	–	–	–	–	–	–	–	–	–	X	–	–
Pine warbler	–	X	–	X	X	–	–	X	X	–	–	–	–	–	X	–	X
Yellow-rumped warbler	–	–	–	–	–	–	–	–	–	–	–	–	X	–	–	–	–
Yellow-throated warbler	X	–	X	X	X	–	–	X	X	X	–	X	–	X	X	X	X
Summer tanager	X	X	–	X	X	X	X	X	X	X	X	X	–	X	X	X	X
Northern cardinal	X	X	X	X	X	X	X	X	X	X	X	X	–	X	X	X	X
Rose-breasted grosbeak	X	–	–	–	–	–	–	–	–	–	–	–	X	–	–	–	–
Indigo bunting	–	–	–	–	–	–	–	X	–	–	–	–	–	–	–	–	–
Observed Species Richness	25	21	24	35	30	27	27	25	26	30	24	28	27	27	32	28	25

¹ Three species were incidentally detected during nocturnal anuran sampling under a separate protocol. Included for completeness.

Results (continued)

Table 2. Landbird naïve occupancy estimates at each sampled location within Congaree National Park in 2022, ranked descending. Refer to Figure 1 for labeled sampling location ID numbers.

Common Name	Scientific Name	Naïve occupancy ¹
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	100.0%
Red-bellied woodpecker	<i>Melanerpes carolinus</i>	100.0%
Pileated woodpecker	<i>Dryocopus pileatus</i>	100.0%
Red-eyed vireo	<i>Vireo olivaceus</i>	100.0%
Tufted titmouse	<i>Baeolophus bicolor</i>	100.0%
Blue-gray gnatcatcher	<i>Poliophtila caerulea</i>	100.0%
Carolina wren	<i>Thryothorus ludovicianus</i>	100.0%
American crow	<i>Corvus brachyrhynchos</i>	94.1%
Northern parula	<i>Setophaga americana</i>	94.1%
Northern cardinal	<i>Cardinalis cardinalis</i>	94.1%
White-eyed vireo	<i>Vireo griseus</i>	88.2%
Summer tanager	<i>Piranga rubra</i>	88.2%
Carolina chickadee	<i>Poecile carolinensis</i>	82.4%
Barred owl ²	<i>Strix varia</i>	76.5%
Great crested flycatcher	<i>Myiarchus crinitus</i>	76.5%
Acadian flycatcher	<i>Empidonax virescens</i>	70.6%
Ruby-crowned kinglet	<i>Corthylio calendula</i>	70.6%
Yellow-throated warbler	<i>Setophaga dominica</i>	70.6%
Red-shouldered hawk	<i>Buteo lineatus</i>	64.7%
Hooded warbler	<i>Setophaga citrina</i>	64.7%
Downy woodpecker	<i>Dryobates pubescens</i>	58.8%
Brown-headed cowbird	<i>Molothrus ater</i>	58.8%
Prothonotary warbler	<i>Protonotaria citrea</i>	58.8%
Red-headed woodpecker	<i>Melanerpes erythrocephalus</i>	41.2%
Pine warbler	<i>Setophaga pinus</i>	41.2%
Mourning dove	<i>Zenaidra macroura</i>	35.3%
Blue jay	<i>Cyanocitta cristata</i>	35.3%
White-breasted nuthatch	<i>Sitta carolinensis</i>	35.3%
Hermit thrush	<i>Catharus guttatus</i>	35.3%
American goldfinch	<i>Spinus tristis</i>	35.3%
Wood duck	<i>Aix sponsa</i>	29.4%
Wild turkey	<i>Meleagris gallopavo</i>	29.4%
Ruby-throated hummingbird	<i>Archilochus colubris</i>	29.4%
Great blue heron	<i>Ardea herodias</i>	29.4%
Yellow-throated vireo	<i>Vireo flavifrons</i>	29.4%
Blue-headed vireo	<i>Vireo solitarius</i>	29.4%

Common Name	Scientific Name	Naïve occupancy ¹
Gray catbird	<i>Dumetella carolinensis</i>	29.4%
Black-and-white warbler	<i>Mniotilta varia</i>	29.4%
Chimney swift	<i>Chaetura pelagica</i>	23.5%
Common grackle	<i>Quiscalus quiscula</i>	23.5%
Chuck-will's-widow (incidental ³)	<i>Antrostomus carolinensis</i>	17.6%
Ovenbird	<i>Seiurus aurocapilla</i>	17.6%
Swainson's warbler	<i>Limnithlypis swainsonii</i>	17.6%
American redstart	<i>Setophaga ruticilla</i>	17.6%
Eastern whip-poor-will (incidental ³)	<i>Antrostomus vociferus</i>	11.8%
Yellow-bellied sapsucker	<i>Sphyrapicus varius</i>	11.8%
Hairy woodpecker	<i>Dryobates villosus</i>	11.8%
Northern flicker	<i>Colaptes auratus</i>	11.8%
Fish crow	<i>Corvus ossifragus</i>	11.8%
Purple martin	<i>Progne subis</i>	11.8%
Eastern bluebird	<i>Sialia sialis</i>	11.8%
White-throated sparrow	<i>Zonotrichia albicollis</i>	11.8%
Kentucky warbler	<i>Geothlypis formosa</i>	11.8%
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	11.8%
Green heron	<i>Butorides virescens</i>	5.9%
Cooper's hawk	<i>Accipiter cooperii</i>	5.9%
Red-tailed hawk	<i>Buteo jamaicensis</i>	5.9%
Belted kingfisher	<i>Megasceryle alcyon</i>	5.9%
Eastern wood-pewee	<i>Contopus virens</i>	5.9%
Brown-headed nuthatch	<i>Sitta pusilla</i>	5.9%
Brown thrasher	<i>Toxostoma rufum</i>	5.9%
Pine siskin	<i>Spinus pinus</i>	5.9%
Eastern towhee	<i>Pipilo erythrophthalmus</i>	5.9%
Baltimore oriole	<i>Icterus galbula</i>	5.9%
Louisiana waterthrush	<i>Parkesia motacilla</i>	5.9%
Blue-winged warbler	<i>Vermivora cyanoptera</i>	5.9%
Orange-crowned warbler	<i>Leiothlypis celata</i>	5.9%
Blackpoll warbler	<i>Setophaga striata</i>	5.9%
Black-throated blue warbler	<i>Setophaga caerulescens</i>	5.9%
Yellow-rumped warbler	<i>Setophaga coronata</i>	5.9%
Indigo bunting	<i>Passerina cyanea</i>	5.9%

¹ Percent of sampled locations ($n = 17$) where species was observed.

² If incidental nocturnal observations are included (see discussion), naïve occupancy for Barred Owl is 94.1%

³ Species incidentally detected during nocturnal anuran sampling under a separate protocol. Included for completeness.

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About the Southeast Coast Network

In 1999, the National Park Service initiated a long-term ecological monitoring program, known as “Vital Signs Monitoring,” to provide the minimum infrastructure to allow more than 270 national park system units to identify and implement long-term monitoring of their highest-priority measurements of resource condition. Monitoring resources in parks develops scientifically sound information on the current status and long-term trends in the composition, structure, and function of park ecosystems, and determines how well current management practices are sustaining those ecosystems.

The NPS Vital Signs Monitoring Program addresses five goals for all parks with significant natural resources:

- Determine the status and trends in selected indicators of the condition of park ecosystem,
- Provide early warning of abnormal conditions,
- Provide data to better understand the dynamic nature and condition of park ecosystems,
- Provide data to meet certain legal and Congressional mandates, and
- Provide a means of measuring progress towards performance goals.

The Southeast Coast Network (SECN) includes eighteen administrative areas containing twenty park units, fifteen of which contain significant and diverse natural resources. In total, SECN parks encompass more than 184,000 acres of federally-managed land across North Carolina, South Carolina, Georgia, Alabama, and Florida. The parks serve a wide diversity of cultural and natural resource missions and include: five national monuments, four national seashores, three national battlefield parks, two national historic parks, a national memorial, a national recreation area, an ecological and historic preserve, and a single national park. The parks range in size from slightly more than 20 acres to nearly 60,000 acres, and when considered with non-federal lands jointly managed with NPS, the network encompasses more than 253,000 acres.

For More Information

SECN Home Page:

<https://www.nps.gov/im/secn/index.htm>

SECN Reports & Publications:

<https://www.nps.gov/im/secn/reports-publications.htm>

About the NPS Inventory & Monitoring Program:

<https://www.nps.gov/im/index.htm>

Data Downloads via the Natural Resource Information Portal:

<https://irma.nps.gov/Portal/>

Appendix A. Documented List of Species Detected

Table A1. Landbirds documented within Congaree National Park based upon records in NPSpecies (NPS 2025) and detections during the 2022 SECN sampling effort. Three nocturnal species were incidentally detected during overnight anuran sampling under a separate protocol. We include them for completeness, but those records are not included in statistical summaries in this table or in the report. Species documented in NPSpecies are indicated with 'P' (present). SECN documented species are indicated with "X". ¹Incidental detection during nocturnal anuran sampling under a separate protocol. Included for completeness.

Order	Family	Scientific Name	Common Name	NPSpecies (2025)	SECN Sampling (2022)
<i>Anseriformes</i>	<i>Anatidae</i>	<i>Branta canadensis</i>	Canada Goose	X	–
–	–	<i>Aix sponsa</i>	Wood Duck	X	X
–	–	<i>Spatula discors</i>	Blue-winged Teal	X	–
–	–	<i>Spatula clypeata</i>	Northern Shoveler	X	–
–	–	<i>Mareca americana</i>	American Wigeon	X	–
–	–	<i>Anas platyrhynchos</i>	Mallard	X	–
–	–	<i>Anas rubripes</i>	American Black Duck	X	–
–	–	<i>Anas crecca</i>	Green-winged Teal	X	–
–	–	<i>Aythya collaris</i>	Ring-necked Duck	X	–
–	–	<i>Lophodytes cucullatus</i>	Hooded Merganser	X	–
<i>Galliformes</i>	<i>Odontophoridae</i>	<i>Colinus virginianus</i>	Northern Bobwhite	X	–
–	<i>Phasianidae</i>	<i>Meleagris gallopavo</i>	Wild Turkey	X	X
<i>Podicipediformes</i>	<i>Podicipedidae</i>	<i>Podilymbus podiceps</i>	Pied-billed Grebe	X	–
<i>Columbiformes</i>	<i>Columbidae</i>	<i>Columba livia</i>	Rock Pigeon	X	–
–	–	<i>Streptopelia decaocto</i>	Eurasian Collared-Dove	X	–
–	–	<i>Zenaida macroura</i>	Mourning Dove	X	X
<i>Cuculiformes</i>	<i>Cuculidae</i>	<i>Coccyzus americanus</i>	Yellow-billed Cuckoo	X	X
–	–	<i>Coccyzus erythrophthalmus</i>	Black-billed Cuckoo	X	–
<i>Caprimulgiformes</i>	<i>Caprimulgidae</i>	<i>Chordeiles minor</i>	Common Nighthawk	X	–
–	–	<i>Antrostomus carolinensis</i>	Chuck-will's-widow	X	X ¹
–	–	<i>Antrostomus vociferus</i>	Eastern Whip-poor-will	X	X ¹
<i>Apodiformes</i>	<i>Apodidae</i>	<i>Chaetura pelagica</i>	Chimney Swift	X	X
–	<i>Trochilidae</i>	<i>Archilochus colubris</i>	Ruby-throated Hummingbird	X	X
<i>Charadriiformes</i>	<i>Charadriidae</i>	<i>Charadrius vociferus</i>	Killdeer	X	–
–	<i>Scolopacidae</i>	<i>Scolopax minor</i>	American Woodcock	X	–
–	–	<i>Gallinago gallinago</i>	Common Snipe	X	–
–	–	<i>Actitis macularius</i>	Spotted Sandpiper	X	–
–	–	<i>Tringa solitaria</i>	Solitary Sandpiper	X	–
–	–	<i>Tringa flavipes</i>	Lesser Yellowlegs	X	–
–	–	<i>Tringa melanoleuca</i>	Greater Yellowlegs	X	–
–	<i>Laridae</i>	<i>Chroicocephalus philadelphia</i>	Bonaparte's Gull	X	–
–	–	<i>Larus delawarensis</i>	Ring-billed Gull	X	–
–	–	<i>Hydroprogne caspia</i>	Caspian Tern	X	–
<i>Gaviiformes</i>	<i>Gaviidae</i>	<i>Gavia immer</i>	Common Loon	X	–
<i>Ciconiiformes</i>	<i>Ciconiidae</i>	<i>Mycteria americana</i>	Wood Stork	X	–
<i>Suliformes</i>	<i>Anhingidae</i>	<i>Anhinga anhinga</i>	Anhinga	X	–
–	<i>Phalacrocoracidae</i>	<i>Phalacrocorax auritus</i>	Double-crested Cormorant	X	–
<i>Pelecaniformes</i>	<i>Ardeidae</i>	<i>Botaurus lentiginosus</i>	American Bittern	X	–
–	–	<i>Ardea herodias</i>	Great Blue Heron	X	X
–	–	<i>Ardea alba</i>	Great Egret	X	–

Order	Family	Scientific Name	Common Name	NPSpecies (2025)	SECN Sampling (2022)
–	–	<i>Egretta thula</i>	Snowy Egret	X	–
–	–	<i>Egretta caerulea</i>	Little Blue Heron	X	–
–	–	<i>Bubulcus ibis</i>	Cattle Egret	X	–
–	–	<i>Butorides virescens</i>	Green Heron	X	X
–	–	<i>Nyctanassa violacea</i>	Yellow-crowned Night-Heron	X	–
–	<i>Threskiornithidae</i>	<i>Eudocimus albus</i>	White Ibis	X	–
–	–	<i>Platalea ajaja</i>	Roseate Spoonbill	X	–
<i>Cathartiformes</i>	<i>Cathartidae</i>	<i>Coragyps atratus</i>	Black Vulture	X	–
–	–	<i>Cathartes aura</i>	Turkey Vulture	X	–
<i>Accipitriformes</i>	<i>Pandionidae</i>	<i>Pandion haliaetus</i>	Osprey	X	–
–	<i>Accipitridae</i>	<i>Elanoides forficatus</i>	Swallow-tailed Kite	X	–
–	–	<i>Aquila chrysaetos</i>	Golden Eagle	X	–
–	–	<i>Circus hudsonius</i>	Northern Harrier	X	–
–	–	<i>Accipiter striatus</i>	Sharp-shinned Hawk	X	–
–	–	<i>Accipiter cooperii</i>	Cooper's Hawk	X	X
–	–	<i>Haliaeetus leucocephalus</i>	Bald Eagle	X	–
–	–	<i>Ictinia mississippiensis</i>	Mississippi Kite	X	–
–	–	<i>Buteo lineatus</i>	Red-shouldered Hawk	X	X
–	–	<i>Buteo platypterus</i>	Broad-winged Hawk	X	–
–	–	<i>Buteo swainsoni</i>	Swainson's Hawk	X	–
–	–	<i>Buteo jamaicensis</i>	Red-tailed Hawk	X	X
<i>Strigiformes</i>	<i>Strigidae</i>	<i>Megascops asio</i>	Eastern Screech-Owl	X	–
–	–	<i>Bubo virginianus</i>	Great Horned Owl	X	–
–	–	<i>Strix varia</i>	Barred Owl	X	X
<i>Coraciiformes</i>	<i>Alcedinidae</i>	<i>Megasceryle alcyon</i>	Belted Kingfisher	X	X
<i>Piciformes</i>	<i>Picidae</i>	<i>Melanerpes erythrocephalus</i>	Red-headed Woodpecker	X	X
–	–	<i>Melanerpes carolinus</i>	Red-bellied Woodpecker	X	X
–	–	<i>Sphyrapicus varius</i>	Yellow-bellied Sapsucker	X	X
–	–	<i>Dryobates pubescens</i>	Downy Woodpecker	X	X
–	–	<i>Dryobates villosus</i>	Hairy Woodpecker	X	X
–	–	<i>Colaptes auratus</i>	Northern Flicker	X	X
–	–	<i>Dryocopus pileatus</i>	Pileated Woodpecker	X	X
<i>Falconiformes</i>	<i>Falconidae</i>	<i>Falco sparverius</i>	American Kestrel	X	–
–	–	<i>Falco columbarius</i>	Merlin	X	–
–	–	<i>Falco peregrinus</i>	Peregrine Falcon	X	–
<i>Passeriformes</i>	<i>Tyrannidae</i>	<i>Myiarchus crinitus</i>	Great Crested Flycatcher	X	X
–	–	<i>Tyrannus verticalis</i>	Western Kingbird	X	–
–	–	<i>Tyrannus tyrannus</i>	Eastern Kingbird	X	–
–	–	<i>Contopus cooperi</i>	Olive-sided Flycatcher	X	–
–	–	<i>Contopus virens</i>	Eastern Wood-Pewee	X	X
–	–	<i>Empidonax virescens</i>	Acadian Flycatcher	X	X
–	–	<i>Empidonax minimus</i>	Least Flycatcher	X	–
–	–	<i>Sayornis phoebe</i>	Eastern Phoebe	X	–
–	<i>Laniidae</i>	<i>Lanius ludovicianus</i>	Loggerhead Shrike	X	–
–	<i>Vireonidae</i>	<i>Vireo griseus</i>	White-eyed Vireo	X	X
–	–	<i>Vireo flavifrons</i>	Yellow-throated Vireo	X	X

Order	Family	Scientific Name	Common Name	NPSpecies (2025)	SECN Sampling (2022)
–	–	<i>Vireo solitarius</i>	Blue-headed Vireo	X	X
–	–	<i>Vireo philadelphicus</i>	Philadelphia Vireo	X	–
–	–	<i>Vireo gilvus</i>	Warbling Vireo	X	–
–	–	<i>Vireo olivaceus</i>	Red-eyed Vireo	X	X
–	Corvidae	<i>Cyanocitta cristata</i>	Blue Jay	X	X
–	–	<i>Corvus brachyrhynchos</i>	American Crow	X	X
–	–	<i>Corvus ossifragus</i>	Fish Crow	X	X
–	Hirundinidae	<i>Riparia riparia</i>	Bank Swallow	X	–
–	–	<i>Tachycineta bicolor</i>	Tree Swallow	X	–
–	–	<i>Stelgidopteryx serripennis</i>	Northern Rough-winged Swallow	X	–
–	–	<i>Progne subis</i>	Purple Martin	X	X
–	–	<i>Hirundo rustica</i>	Barn Swallow	X	–
–	–	<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	X	–
–	Paridae	<i>Poecile carolinensis</i>	Carolina Chickadee	X	X
–	–	<i>Baeolophus bicolor</i>	Tufted Titmouse	X	X
–	Sittidae	<i>Sitta canadensis</i>	Red-breasted Nuthatch	X	–
–	–	<i>Sitta carolinensis</i>	White-breasted Nuthatch	X	X
–	–	<i>Sitta pusilla</i>	Brown-headed Nuthatch	X	X
–	Certhiidae	<i>Certhia americana</i>	Brown Creeper	X	–
–	Troglodytidae	<i>Troglodytes aedon</i>	House Wren	X	–
–	–	<i>Troglodytes hiemalis</i>	Winter Wren	X	–
–	–	<i>Thryothorus ludovicianus</i>	Carolina Wren	X	X
–	Poliophtilidae	<i>Poliophtila caerulea</i>	Blue-gray Gnatcatcher	X	X
–	Regulidae	<i>Regulus satrapa</i>	Golden-crowned Kinglet	X	–
–	–	<i>Regulus calendula</i>	Ruby-crowned Kinglet	X	X
–	Turdidae	<i>Sialia sialis</i>	Eastern Bluebird	X	X
–	–	<i>Catharus fuscescens</i>	Veery	X	–
–	–	<i>Catharus minimus</i>	Gray-cheeked Thrush	X	–
–	–	<i>Catharus bicknelli</i>	Bicknell's Thrush	X	–
–	–	<i>Catharus ustulatus</i>	Swainson's Thrush	X	–
–	–	<i>Catharus guttatus</i>	Hermit Thrush	X	X
–	–	<i>Hylocichla mustelina</i>	Wood Thrush	X	–
–	–	<i>Turdus migratorius</i>	American Robin	X	–
–	Mimidae	<i>Dumetella carolinensis</i>	Gray Catbird	X	X
–	–	<i>Toxostoma rufum</i>	Brown Thrasher	X	X
–	–	<i>Mimus polyglottos</i>	Northern Mockingbird	X	–
–	Sturnidae	<i>Sturnus vulgaris</i>	European Starling	X	–
–	Bombycillidae	<i>Bombycilla cedrorum</i>	Cedar Waxwing	X	–
–	Passeridae	<i>Passer domesticus</i>	House Sparrow	X	–
–	Motacillidae	<i>Anthus rubescens</i>	American Pipit	X	–
–	Fringillidae	<i>Coccothraustes vespertinus</i>	Evening Grosbeak	X	–
–	–	<i>Haemorhous mexicanus</i>	House Finch	X	–
–	–	<i>Haemorhous purpureus</i>	Purple Finch	X	–
–	–	<i>Spinus pinus</i>	Pine Siskin	X	X
–	–	<i>Spinus tristis</i>	American Goldfinch	X	X
–	Passerellidae	<i>Peucaea aestivalis</i>	Bachman's Sparrow	X	–

Order	Family	Scientific Name	Common Name	NPSpecies (2025)	SECN Sampling (2022)
–	–	<i>Spizella passerina</i>	Chipping Sparrow	X	–
–	–	<i>Spizella pusilla</i>	Field Sparrow	X	–
–	–	<i>Passerella iliaca</i>	Fox Sparrow	X	–
–	–	<i>Junco hyemalis</i>	Dark-eyed Junco	X	–
–	–	<i>Zonotrichia albicollis</i>	White-throated Sparrow	X	X
–	–	<i>Pooecetes gramineus</i>	Vesper Sparrow	X	–
–	–	<i>Centronyx henslowii</i>	Henslow's Sparrow	X	–
–	–	<i>Passerculus sandwichensis</i>	Savannah Sparrow	X	–
–	–	<i>Melospiza melodia</i>	Song Sparrow	X	–
–	–	<i>Melospiza lincolnii</i>	Lincoln's Sparrow	X	–
–	–	<i>Melospiza georgiana</i>	Swamp Sparrow	X	–
–	–	<i>Pipilo erythrophthalmus</i>	Eastern Towhee	X	X
–	Icteridae	<i>Icteria virens</i>	Yellow-breasted Chat	X	–
–	Icteridae	<i>Dolichonyx oryzivorus</i>	Bobolink	X	–
–	–	<i>Sturnella magna</i>	Eastern Meadowlark	X	–
–	–	<i>Icterus spurius</i>	Orchard Oriole	X	–
–	–	<i>Icterus galbula</i>	Baltimore Oriole	X	X
–	–	<i>Agelaius phoeniceus</i>	Red-winged Blackbird	X	–
–	–	<i>Molothrus ater</i>	Brown-headed Cowbird	X	X
–	–	<i>Euphagus carolinus</i>	Rusty Blackbird	X	–
–	–	<i>Quiscalus quiscula</i>	Common Grackle	X	X
–	Parulidae	<i>Seiurus aurocapilla</i>	Ovenbird	X	X
–	–	<i>Helmitheros vermivorum</i>	Worm-eating Warbler	X	–
–	–	<i>Parkesia motacilla</i>	Louisiana Waterthrush	X	X
–	–	<i>Parkesia noveboracensis</i>	Northern Waterthrush	X	–
–	–	<i>Vermivora chrysoptera</i>	Golden-winged Warbler	X	–
–	–	<i>Vermivora cyanoptera</i>	Blue-winged Warbler	X	X
–	–	<i>Mniotilta varia</i>	Black-and-white Warbler	X	X
–	–	<i>Protonotaria citrea</i>	Prothonotary Warbler	X	X
–	–	<i>Limnithlypis swainsonii</i>	Swainson's Warbler	X	X
–	–	<i>Leiothlypis peregrina</i>	Tennessee Warbler	X	–
–	–	<i>Leiothlypis celata</i>	Orange-crowned Warbler	X	X
–	–	<i>Leiothlypis ruficapilla</i>	Nashville Warbler	X	–
–	–	<i>Geothlypis philadelphia</i>	Mourning Warbler	X	–
–	–	<i>Geothlypis formosa</i>	Kentucky Warbler	X	X
–	–	<i>Geothlypis trichas</i>	Common Yellowthroat	X	–
–	–	<i>Setophaga citrina</i>	Hooded Warbler	X	X
–	–	<i>Setophaga ruticilla</i>	American Redstart	X	X
–	–	<i>Setophaga tigrina</i>	Cape May Warbler	X	–
–	–	<i>Setophaga cerulea</i>	Cerulean Warbler	X	–
–	–	<i>Setophaga americana</i>	Northern Parula	X	X
–	–	<i>Setophaga magnolia</i>	Magnolia Warbler	X	–
–	–	<i>Setophaga castanea</i>	Bay-breasted Warbler	X	–
–	–	<i>Setophaga fusca</i>	Blackburnian Warbler	X	–
–	–	<i>Setophaga petechia</i>	Yellow Warbler	X	–
–	–	<i>Setophaga pensylvanica</i>	Chestnut-sided Warbler	X	–

Order	Family	Scientific Name	Common Name	NPSpecies (2025)	SECN Sampling (2022)
–	–	<i>Setophaga striata</i>	Blackpoll Warbler	X	X
–	–	<i>Setophaga caerulescens</i>	Black-throated Blue Warbler	X	X
–	–	<i>Setophaga palmarum</i>	Palm Warbler	X	–
–	–	<i>Setophaga pinus</i>	Pine Warbler	X	X
–	–	<i>Setophaga coronata</i>	Yellow-rumped Warbler	X	X
–	–	<i>Setophaga dominica</i>	Yellow-throated Warbler	X	X
–	–	<i>Setophaga discolor</i>	Prairie Warbler	X	–
–	–	<i>Setophaga virens</i>	Black-throated Green Warbler	X	–
–	–	<i>Cardellina canadensis</i>	Canada Warbler	X	–
–	Cardinalidae	<i>Piranga rubra</i>	Summer Tanager	X	X
–	–	<i>Piranga olivacea</i>	Scarlet Tanager	X	–
–	–	<i>Cardinalis cardinalis</i>	Northern Cardinal	X	X
–	–	<i>Pheucticus ludovicianus</i>	Rose-breasted Grosbeak	X	X
–	–	<i>Passerina caerulea</i>	Blue Grosbeak	X	–
–	–	<i>Passerina cyanea</i>	Indigo Bunting	X	X