



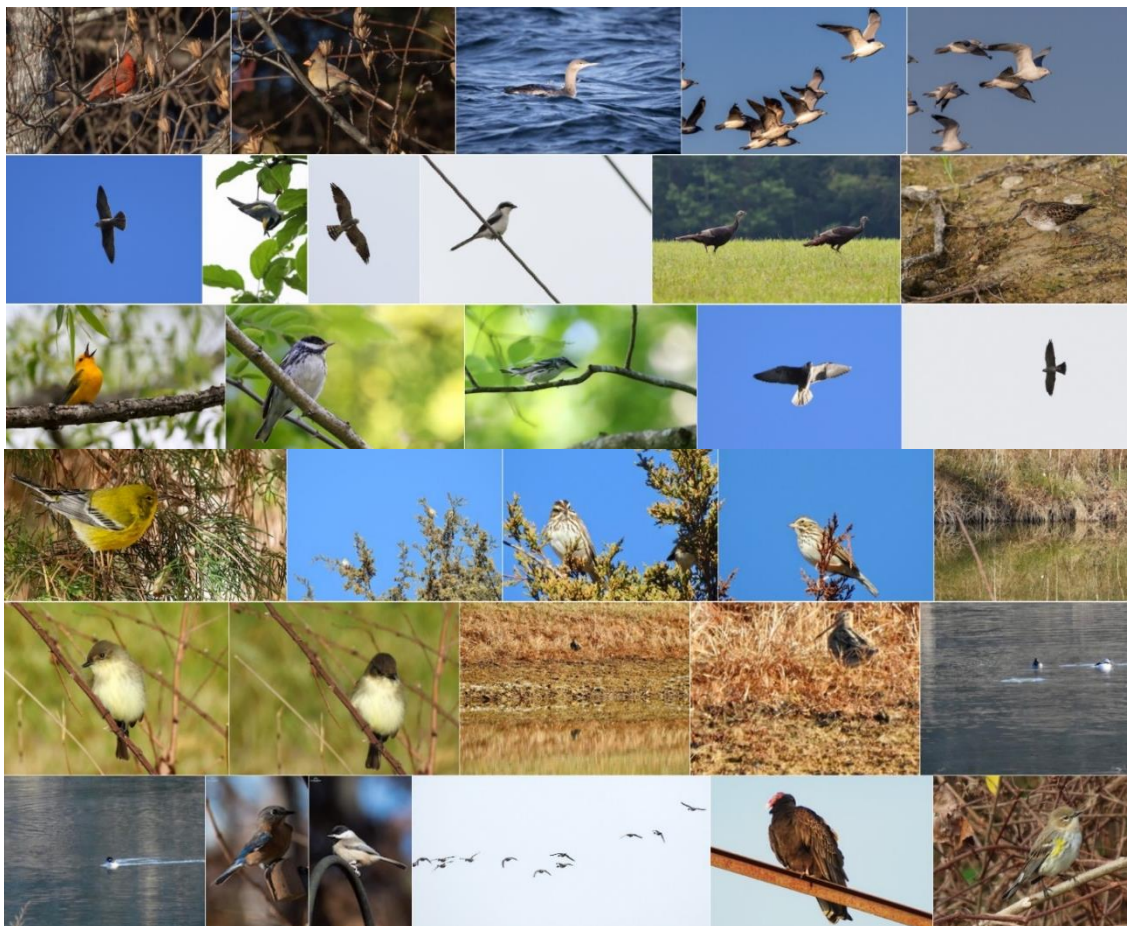
North Carolina Bird Atlas

Interim Report



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NC Bird Atlas portal photos, Macaulay Library.

Permit Details

- Study#: CALO-00135, Permit#: CALO0-2021-SCI-0016
- Study#: CAHA-00154, Permit#: CAHA-2021-SCI-0014
- Study#: GRSM-02154, Permit#: GRSM-2021-SCI-2154
- Study#: BLRI-00509, Permit#: BLRI-2021-SCI-0025

Introduction

The North Carolina Wildlife Action Plan (NCWAP - North Carolina Wildlife Resources Commission 2015), a comprehensive conservation plan developed with input from a diverse partnership of organizations, recommends long-term distribution and status surveys for 99 avian Species of Greatest Conservation Need (SGCN). Tracking the distribution and abundance of a single or small group of species is expensive and labor-intensive, and the resources required to comprehensively address the needs outlined in the NCWAP cannot be addressed by one organization alone. Bird atlases, which have a long and distinguished history in Europe and North America, provide a tested method to capture a snapshot of the spatial distribution and abundance of most priority bird species in North Carolina (Beck et al. 2018).

A single ornithological atlas addresses conservation needs for the greatest number of species in three ways:

- 1) Providing high-quality, statewide distribution and abundance data for many species,
- 2) Attracting and strengthening the diversity of partnerships required to accomplish its goals, and
- 3) Engaging the public in conservation work.

Bird atlas projects provide accurate, repeatable, and actionable data, inform decision-making on conservation issues and management actions, and generate novel research opportunities to further investigate rare or imperiled bird species. By design, an atlas will encourage participants to inspect remote locations seldom visited while capturing data on all species at once. By surveying all habitats within the sampling units spread across the state, atlas data can be used to estimate the number of species present in any given geographic area, providing more precise information on distribution (i.e., range) and regional abundance. We currently lack reliable population estimates for more than half of 281 species tracked by the NCWAP.

Atlas projects are a catalyst for partner involvement, touching on the priorities of multiple organizations and filling the gap between resources and needs. An atlas approach that leverages partner resources is more productive and more efficient than specialized, single-species surveys undertaken by a single entity. Audubon North Carolina identifies 26 priority species in the state (25 of which are also SGCN), all of which would benefit from an atlas. An atlas would also increase data on the 81 species tracked by the NC Natural Heritage Program. These data are crucial in guiding mitigation and land acquisition, establishing baselines to set conservation priorities and guide actions, and evaluating impacts of local, landscape, and environmental change across the entire state of North Carolina.

Conservation is about people as much as it is about wildlife. Conducting a bird atlas also provides a unique opportunity to simultaneously engage and inform the public who will contribute to the collection of valuable data. North Carolina would require volunteer surveys of over 900 survey grids, engaging approximately 1,400 citizen scientists over 6 years of survey effort.

Methods

North Carolina has adapted and optimized a well-documented, standardized Atlas methodology for the NCBA. The ability of an Atlas to meet its objectives is heavily dependent upon volunteer participation, which is difficult to gauge before the project begins. However, over 48,000 hours of bird observations in North Carolina were reported to eBird from April 1-August 31, 2018, and is a reliable indicator that we will have a strong volunteer turnout for an Atlas. Data is being collected and contributed to the project in multiple ways, but volunteer participation has occurred via two primary avenues: strategic block surveys and casual observations. In addition, ancillary data sources and targeted surveys including those from many other existing and ongoing monitoring and research efforts will also be incorporated. Lastly, trained, seasonal technicians will conduct targeted point count surveys during the spring and summer seasons to develop more precise estimates of abundance and density.

Strategic Block Surveys

Block surveys entail collection of avian data within predefined geographic grid cells across the state relying on a mostly volunteer workforce. Each block represents $1/6^{\text{th}}$ of a 7.5minute USGS topographic quadrangle (1 block = roughly 9 sq mi). Observer effort is tracked within each target block, and parameters are developed to identify when a block has been completed. Observers document the avian species they encounter within each block, an estimated number of individuals, and during the summer assigns to each a code that designates the level of breeding evidence for that species.

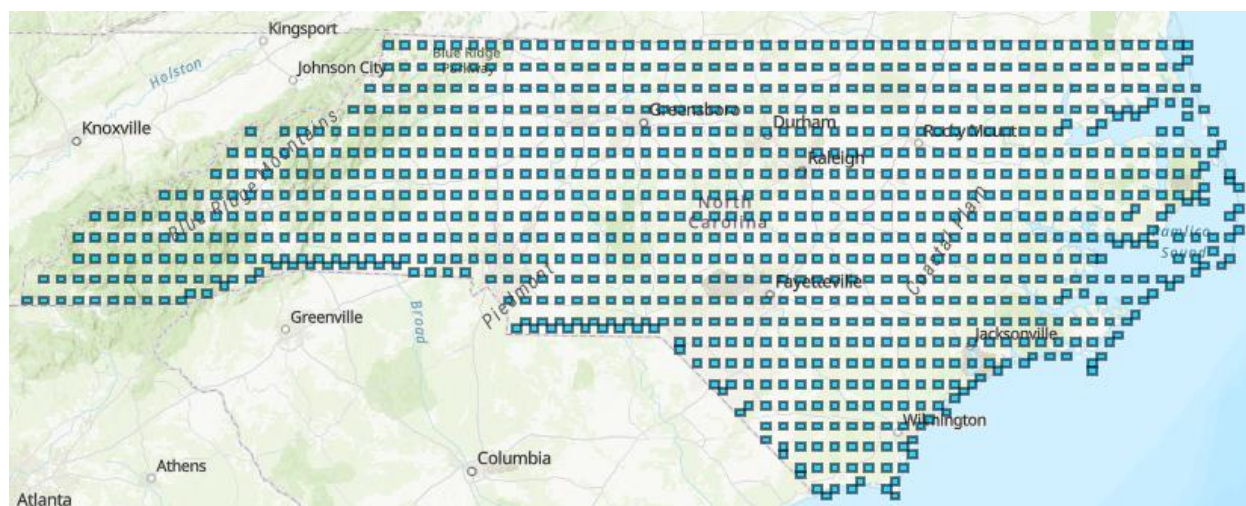


Figure 1. Priority blocks used for sampling during NC Bird Atlas.

Block surveys primarily provide data to accurately define species distribution through systematic sampling. We selected 937 blocks as 'priority' from each quadrangle (Fig. 1). Blocks will be surveyed approximately 25-30 hours over the course of the spring, summer and winter months.

Casual Observations

Birders serendipitously encounter species in unexpected places or even throughout their normal day-to-day routine, but this often occurs outside of priority blocks they are assigned to. Moreover, many birders are solely interested in listing and have no interest in following standardized atlas protocols. By allowing

volunteers to survey anywhere and at anytime, we will be able to develop more comprehensive distribution maps and will also encourage more birders of all skill levels to participate.

Enhanced Methodology

Recent Atlases in other states have increased the scope of data collected by pursuing additional methodologies beyond those employed by traditional Atlases. These include: quantitative surveys, targeted surveys, and use of data from existing avian surveys concurrent with the NCBA.

Quantitative Surveys

Abundance data adds a third dimension to species distribution data by not only informing us of where a species occurs, but in what numbers. We will pursue the collection of abundance data through the use of standardized point counts. Data will be collected over a four-year period by trained observers during the breeding seasons using a block-based, primarily road-based quantitative sampling scheme. Counts will be ten-minutes and distance sampling and time of detection techniques will be employed to estimate bird densities.

Modeled density maps and state-level population estimates will be possible for many, though not all, species. Rarity and low detectability reduce the accuracy or feasibility of model development. Given the nature of the methodology, these models are biased toward songbirds and more accessible habitats and for species with a higher degree of detectability. Despite these shortcomings, they provide a wealth of information that will guide conservation planning and management for a broad spectrum of species.

Targeted and existing surveys

Several species present challenges to being surveyed via traditional atlas methodology. Among them are species that are unreliably detected via area searches, species whose habitat associations or geographic distribution present logistical difficulties, and nocturnal species. Surveys for nocturnal species (ex. rails, owls, and nightjars) primarily require a shift in time of day of survey. As such, they can be accomplished by atlas volunteers with guidance via specially-developed protocols, which are available in our volunteer handbook: <https://ebird.org/atlasnc/about/handbook>.

Because of the logistical challenges of accessing the habitats that support them, suites of species such as shorebirds, waterbirds, marshbirds and some waterfowl are generally under-surveyed by volunteer atlasers. Fortunately, North Carolina benefits from a number of methodical and regularly-occurring avian surveys and censuses that include many of these challenging species, as well as more accessible species. These efforts will benefit from newly recruited volunteer pool from atlas outreach and engagement. Where possible, we plan to incorporate the data generated from such surveys into atlas distribution analyses. These include and are not limited to:

- Annual shorebird surveys, including Piping and Wilson's Plovers;
- Raptors, including Peregrine Falcon and Bald Eagle;
- Red-cockaded Woodpecker;
- Center for Conservation Biology's Nightjar Survey Network;
- Game birds, including waterfowl, woodcock, quail, grouse, turkey, and dove;
- Annual point count-based landbird surveys conducted by the US Forest Service on the National Forests and other publicly owned lands, such as military installations;
- Coastal Plain surveys for colonially-nesting waterbirds (herons, egrets, ibises, gulls, terns, skimmers, pelicans and cormorants), which are repeated every 3 years;

- US Geological Survey's Breeding Bird Surveys and bird banding efforts;
- National Audubon Society's Christmas and Backyard Bird Counts;
- Cornell Lab of Ornithology's NestWatch and FeederWatch;
- www.chimneyswift.org

Data Storage and Analysis

We encourage atlasers to submit their data via eBird to the NC Bird Atlas portal at www.ncbirdatlas.org, or the eBird smartphone app. All data submitted to any eBird data portal at a location within North Carolina will be evaluated for inclusion in final NCBA analysis and products.

Data collected through traditional atlas methodology and via a quantitative sampling survey (point counts) will be analyzed by outside contractors or partners and made available at the end of the project. Data analysis will include, but will not be limited to: summary block statistics, production of maps of current species distributions, analysis of and production of maps of change in species distributions, analysis and modeling of abundance/density data, and generation of species-specific population estimates.

Preliminary Findings

As of December 13, 2021, the NC Bird Atlas portal has received 38,531 checklists submitted by nearly 900 atlasers across the entire state. Within permitted USNPS properties, over 3,000 checklists were submitted to our specific eBird NCBA data portal from January 1-October 31, 2021.

There was considerable variability of effort across properties and time of year (Table 1, Appendix A), with the most activity occurring on the Blue Ridge Parkway and Cape Hatteras National Seashore. This is expected for several reasons, including species diversity, accessibility, and popularity of each site. In addition, over 900 standardized point counts were performed across North Carolina with fourteen (14) occurring on Cape Hatteras National Seashore and seven (7) along the Blue Ridge Parkway.

Table 1. Total checklists submitted to eBird NC Bird Atlas data portal, January (Jan)-October (Oct), 2021.

Property	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Total
Cape Hatteras	0	0	7	19	49	131	63	62	24	58	413
Cape Lookout	0	0	0	7	0	1	3	0	4	1	16
Great Smoky Mt	0	0	1	11	11	38	17	1	2	0	81
Blue Ridge Pkwy	35	68	164	355	780	690	402	333	480	150	3457

Literature Cited

- Beck, G.G., A.R. Couturier, C.M. Francis, and S. Leckie. 2018. North American Ornithological Atlas Committee Handbook: A Guide for Managers on the Planning and Implementation of a Breeding Bird Atlas Project. Bird Studies Canada, Port Rowan, Ontario, 148 pp.
- North Carolina Wildlife Resources Commission. 2015. *North Carolina Wildlife Action Plan*. Raleigh, NC.

APPENDIX A – Total checklists by property and month

