



Volunteer Handbook 2021- 2026

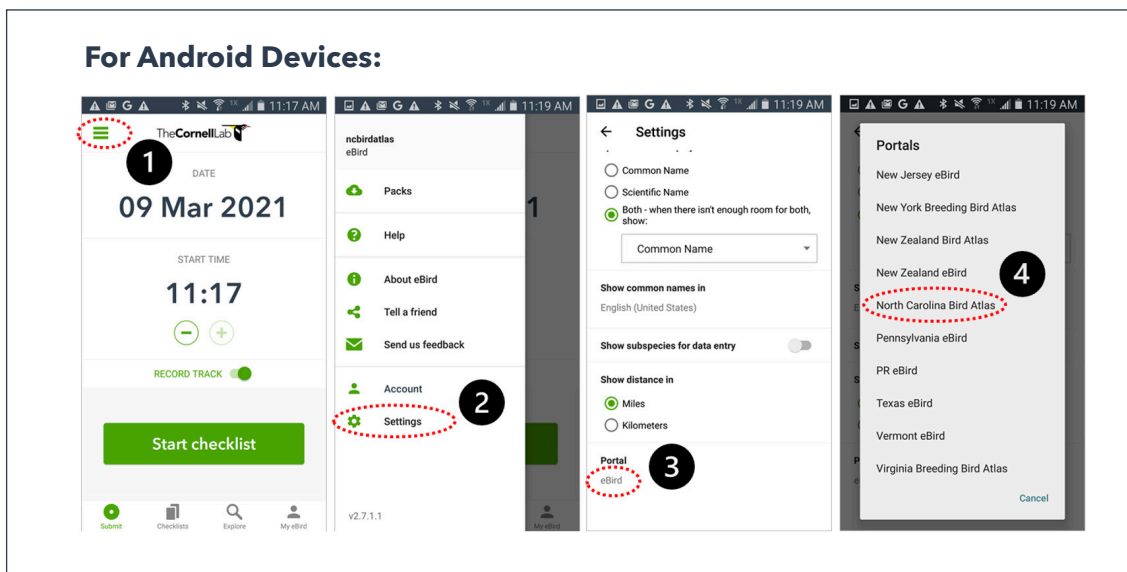
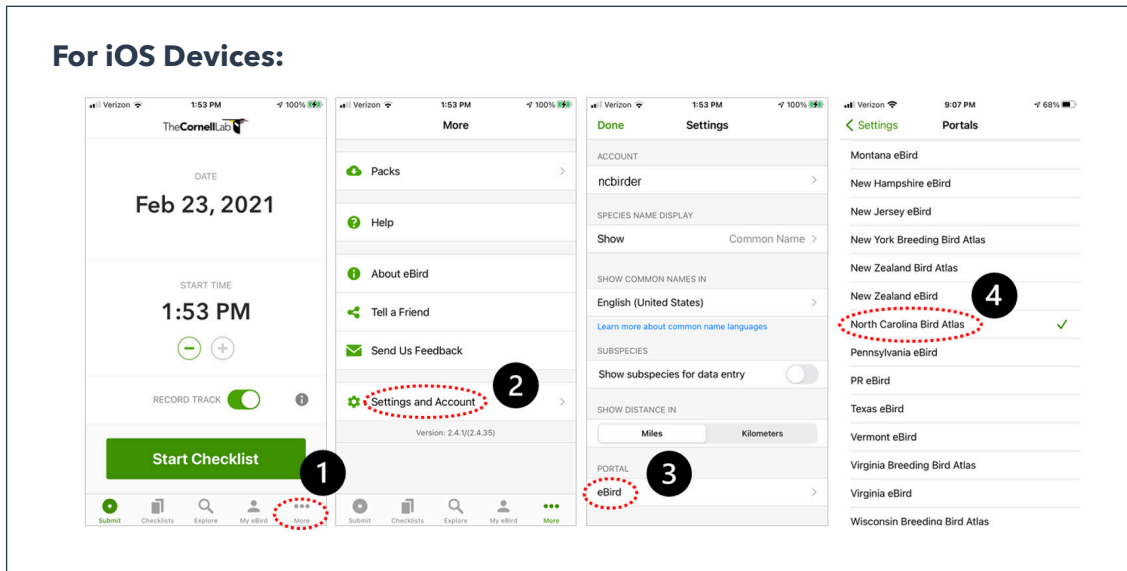
Version 2.1

(latest changes are in RED)

Table of Contents	
Quick Start Guide	3
Funding	5
Acknowledgements	5
Introduction	5
Objectives	6
What is Atlasing?	8
The NC Atlas Block System	9
Block Maps.....	10
Sign Up for a Priority Block.....	11
General Atlasing.....	12
Block Completion Guidelines.....	12
Survey Methods	13
Documenting Priority Species	16
Data Entry	17
Breeding Behaviors	19
Volunteer Hours.....	21
Atlas Ethics	21
Support the Atlas.....	23
Appendix A: Breeding Codes	24
Appendix B. Rare Species List	32
Appendix C. Species Survey Strategies	33
Appendix D: Field Guide - COMING SOON	35

QUICK START GUIDE

- 1 Join our newsletter at news.NCBirdAtlas.org to receive updates and announcements.
- 2 Create eBird account at ebird.org
 - A. Download eBird from the App Store onto your smartphone ([iOS](#), [Android](#)).
 - B. Log into your eBird account and select "North Carolina Bird Atlas" as your portal.



3 How much do you want to atlas?

A LITTLE

- **Record Observations in the NC Bird Atlas Portal:** Birds observed or heard from your backyard, farm, or favorite local park.
- Review [bird breeding behavior codes](#) and add them to your observations in eBird.

A LITTLE MORE

- **Record Observations in the NC Bird Atlas Portal:** Birds observed or heard from your backyard, farm, or favorite local park.
- Review [bird breeding behavior codes](#) and add them to your observations in eBird.
- **Collect data in a [Priority Block](#):** Record all birds observed and heard, while keeping trips to <1 mile and <1 hour in length.

A LOT

- **Record Observations in the NC Bird Atlas Portal:** Birds observed or heard from your backyard, farm, or favorite local park.
- Review [bird breeding behavior codes](#) and add them to your observations in eBird.
- **Collect data in a [Priority Block](#):** Record all birds observed and heard, while keeping trips to <1 mile and <1 hour in length.
- **[Adopt a block\(s\)](#)** and become the Primary Atlaser.
- **Explore all habitat** within a Priority Block and **make repeat trips**.
- With a partner **do nocturnal surveys** within a priority block.

ADDITIONAL WAYS TO SUPPORT THE NC BIRD ATLAS:

- Landowners contact the Regional or Program Coordinators to provide access.
- Purchase NC Bird Atlas products from our [Zazzle Store](#).

ALL BIRDING RECORDS MUST BE SUBMITTED INTO EBIRD

- 4 Reach out to your [Regional Coordinator](#) or [Program Coordinator](#) if you have any questions.
- 5 Check out [ncBirdAtlas.org](#) for additional information on the NC Bird Atlas Project and register for upcoming workshops and trainings.
- 6 GO ATLAS & Spread the word - explore NC and be a part of avian conservation across our state.

Funding

The NC Bird Atlas is funded by the NC Wildlife Resources Commission (NCWRC) through the Pittman-Robertson (PR) Act, which is considered the Nation's oldest and most successful federal wildlife restoration program. This source pays up to 75% of the cost of approved state wildlife projects, thus requiring the NCWRC to secure the remaining 25%. Volunteer efforts, such as those associated with our atlas, can be used as 'match' and will significantly help reduce the overall cost of this 5-year project.

Acknowledgements

We have borrowed extensively from the well-written handbooks for recently completed and ongoing atlas efforts in other states. We especially thank coordinators and organizers from these projects for their advice, encouragement, and support:

- Julia Hart, Ian Davies, and Matt Schlesinger (New York Breeding Bird Atlas III)
- Dr. Ashely Peele, Michael St. Germain, and Sergio Harding (Virginia Breeding Bird Atlas 2)
- Nicholas Anich (Wisconsin Breeding Bird Atlas II)
- Richard Bailey (West Virginia Breeding Bird Atlas 2)
- Dr. Adrienne Leppold, Glen Mittelhauser, and Dr. Evan Adams (Maine Bird Atlas)
- Matt Shumar (Ohio Breeding Bird Atlas II)
- Lee Pfannmuller (Minnesota Breeding Bird Atlas)
- Gabriel Foley (Maryland & DC Breeding Bird Atlas 3)
- Dr. Chris Elphick (Connecticut Bird Atlas)

Introduction

Bird Atlases began in the 1950's in Great Britain with ornithologists leveraging the assistance of the active birding community to document the distribution and abundance of breeding bird species. This method used by scientists spread to the United States in the 1970's where American ornithologists began using maps divided into grids or survey block units. This grid, or block, survey system remains in use today as the modern Bird Atlas method.

The use of Bird Atlases has become one of the most important tools for conservation and land management in the majority of states in the [United States](#). Bird populations across the country face challenges from changes in land use, climate change effects, novel and expanding invasive species, and human development. Bird Atlases provide land managers and scientists with comprehensive data on bird populations through an effort that leverages thousands of active bird observers. The data collected through bird

atlases is critical in informing conservation strategies and land management practices to ensure bird diversity for the future. While Bird Atlases usually focus on observing breeding birds, several states (Connecticut and Maine) have also expanded their efforts to look at the distribution and abundance of wintering bird species. The North Carolina Bird Atlas will occur annually from November to August, because many species of greatest conservation need spend the winter in North Carolina. This will allow us to document a more comprehensive picture of the full avian life cycle and the role North Carolina plays in helping to protect all our birds.

The North Carolina Bird Atlas (NCBA) will occur across the state from 2021-2026. The project will involve thousands of fieldwork volunteers to conduct bird observations year-round, as well as countless individuals supporting the work in a variety of other ways. To accomplish this task, North Carolina has been divided into approximately 5,600 blocks each roughly 9 square miles in area. Of these roughly 5,600 blocks, we selected 937 as priority blocks to ensure even coverage of the state by volunteer effort. Within each priority block, observers will attempt to ascertain the presence, breeding status, and relative abundance of as many species as possible. Volunteers will record observations of birds at precise geographical locations and submit their data through eBird in real time. Therefore, summaries of incoming data such as effort totals, species lists, and maps will be available online as the project proceeds.

We anticipate this project will encourage bird enthusiasts across North Carolina, both new and experienced to observe and document any birds they are seeing, make some new friends, learn more about the natural history of the birds, and have some fun while supporting and contributing to the ornithological research and conservation in their state. Participating in an atlas provides individuals with the opportunity to become more intimately familiar with the birds in their own community while growing their birding skills beyond just a species list to now incorporating observations of bird behavior as well. Throughout this project it is our hope that across the state, birders will grow into enthusiastic Atlasers, novices learn to love a new hobby, and bird lovers find new avenues to support the research and conservation of their winged friends.

Objectives

The NC Bird Atlas objectives are three-fold:

1. To provide better data to enhance on-the-ground management for many species.
2. To engage North Carolinians, including landowners, hunters, youth, community scientists, and under-represented communities in avian conservation efforts.

3. To attract and strengthen the diversity of partnerships required to accomplish our goals.

Project Administration

Steering Committee

- Scott Anderson (NC Wildlife Resources Commission)
- John Carpenter, Chair (NC Wildlife Resources Commission)
- John Hammond (US Fish and Wildlife Service)
- Dr. Joe Poston (Catawba College)
- Dr. Jamie Rotenberg (University of North Carolina-Wilmington)
- Curtis Smalling (Audubon North Carolina)
- Kristopher Smith, Coordinator (NC Wildlife Resources Commission)
- Nathan Tarr (US Geologic Survey Cooperative Fish and Wildlife Research Unit, NC State University)

Outreach Sub-Committee

- Scott Anderson, Chair (NC Wildlife Resources Commission)
- Mike Campbell (NC Wildlife Resources Commission)
- Paula Mandarino (NC Wildlife Resources Commission)
- Allison Medford (NC Wildlife Resources Commission)
- John Ann Shearer (US Fish and Wildlife Service)
- Ben Graham (Audubon North Carolina)
- John Stanton (US Fish and Wildlife Service)
- Kristopher Smith, Coordinator (NC Wildlife Resources Commission)
- Liani Yirka (City of Raleigh Parks, Recreation and Cultural Resources)

Science Sub-Committee

- John Carpenter, Co-Chair (NC Wildlife Resources Commission)
- Nathan Tarr, Co-Chair (US Geologic Survey Cooperative Fish and Wildlife Research Unit, NC State University)
- Scott Anderson (NC Wildlife Resources Commission)
- Kristopher Smith, Coordinator (NC Wildlife Resources Commission)
- Dr. Joe Poston (Catawba College)
- Will Ricks (Duke Energy)
- Dr. Jamie Rotenberg (University of North Carolina-Wilmington)
- Dr. Scott Pearson (Oak Ridge National Laboratory)
- Judy Ratcliffe (NC Natural Heritage Program)

Project Coordinator

The North Carolina Bird Atlas Project Coordinator will be responsible for coordinating the day-to-day activities of the atlas including providing training, supply materials and assistance to the project's Regional Teams. The Atlas Project Coordinator will also work with Regional Teams to facilitate updates to the project website, recruit volunteers, produce reports, and other tasks that support the North Carolina Bird Atlas Project.

Regional Coordinators

The North Carolina Bird Atlas Project will have a set of Regional Teams located throughout the state. Working alongside the Project Coordinator, Regional Teams support the Bird Atlas by coordinating volunteer observers, providing trainings and speaking engagements to the local community as a means of recruiting support and volunteers for the project, and ensuring the survey blocks within their region have adequate coverage. Regional Teams monitor the progress of surveys in their region, ensure data quality, and serve as a point of contact for volunteers in their area. If you are interested, contact the Project Coordinator (coordinator@ncbirdatlas.org) for more information and how to sign up!

What is Atlasing?

A bird atlas is a large-scale, standardized survey that mobilizes skilled volunteers and biologists to systematically survey vast areas, usually over a period of five years. Observing birds for an atlas differs from typical birding in a few ways:

- 1) **Locate** and **Record** all birds present in all habitats, this includes reporting species during the winter as well.
- 2) Slow down, **Observe** and **Document** bird behaviors that are indicative of breeding status.

Since the NC Bird Atlas will occur across the state, the state is broken up into smaller priority blocks to focus atlasing efforts. Within each priority block, volunteers will try to survey each of the different habitat types and document as many species, and their breeding behaviors if applicable, as possible. Volunteers are likely to explore new areas where they would not have considered going birding and may find themselves regularly visiting a powerline right-of-way or a small patch of wetland just to find a Field Sparrow or Wood Duck, and in the process stumble upon a Brown Thrasher or Prothonotary

Warbler. This is the excitement of atlasing— going to new places, finding unexpected birds, and observing bird behaviors they have not previously seen.

Ways to Volunteer

There are many ways individuals can support the NC Bird Atlas. If you enjoy observing birds and have the time to record and report your observations, we encourage you to sign up for a priority block. If you, friends or family, or your organization own land in the state that Atlasers can access to make their observations, we need your help too. No contribution is too small, and every little bit will help us amass enough support to complete a comprehensive NC Bird Atlas. Below are some of the roles we anticipate we will need support with for the bird atlas. If you have another way to contribute but do not see it listed, please get in touch with the NC Bird Atlas Coordinator or a Regional Team to discuss how to support the NC Bird Atlas.

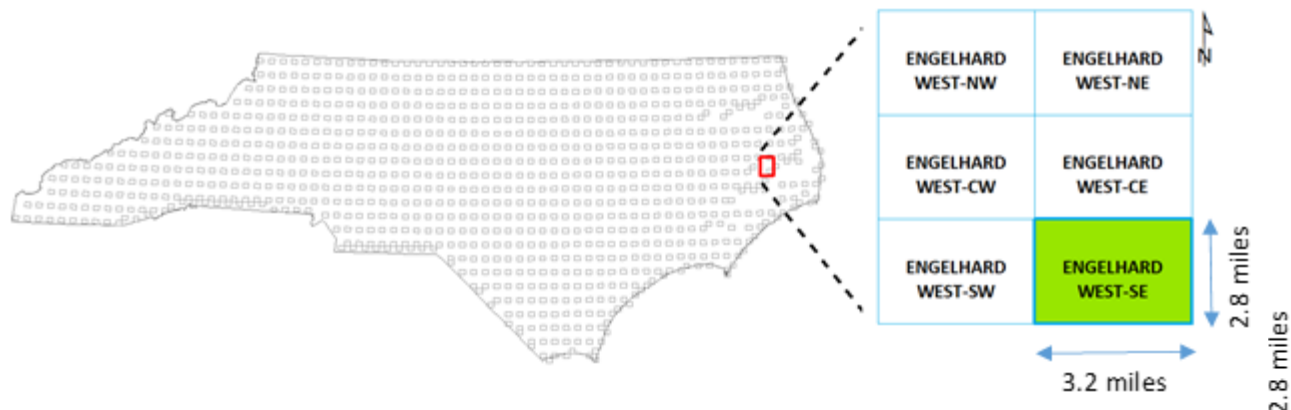
- Atlasing
- Providing land access to Atlasers – contact landaccess@ncbirdatlas.org
- Supporting atlasing groups or individuals
- Mentoring new birders
- Fundraising
- Hosting a meeting or a meet-up to learn more or volunteer

You do not have to be an avid birder to contribute data. Anyone can contribute information and records to the project, regardless of how much time you spent observing birds. If you are interested in spending time surveying a block for the NC Bird Atlas, we welcome your help. But if you just found a bird nesting in your yard and want to contribute that information, that is useful as well. Anyone with an interest in birds can contribute records to the atlas. All we ask is that you enter your data into the *North Carolina Bird Atlas portal on eBird* (see the Data Entry section).

The NC Atlas Block System

In order to make surveying the entire state of North Carolina more manageable, sampling units called blocks have been established using a grid system based on 7.5-minute (1:24,000) topographic quadrangle maps (quads) prepared by the U.S. Geological Survey. Each of the topo quads that covers the state is further divided into 6 atlas blocks, each roughly 3 x 3 miles and encompassing about 9 square miles (~23 square km). This creates a system of approximately 5,600 blocks statewide.

Each block is named based on the topo quad name followed by a 2-letter code denoting the ordinal direction: northwest (NW), northeast (NE), center-west (CW), center-east (CE), southwest (SW), or southeast (SE).



While the importance of completing a priority block is emphasized, there is no restriction from atlasing in other blocks. In fact, surveys in non-priority blocks are welcomed, but not at the expense of priority blocks. For example, if your residence or cabin is not within a priority block, you could survey in the nearest priority block as well as in the block that contains your property. Incidental reports from non-priority blocks can provide important information on rare species and areas that might not otherwise receive coverage. Non-priority blocks can also be targeted if the priority blocks in your area are completed and your atlasing effort is limited geographically. Overall, we are striving to completely survey all SE priority blocks and then as many non-priority blocks as effort allows.

Block Maps

It will be very important that your eBird checklists identify the name of the block your observations took place in. To help you know which block you are in while doing field surveys, we provide block maps in several formats.

eBird mobile app

An exciting recent development within the eBird app is the ability to see priority block boundaries within the eBird app.

Paper Maps

Traditional static PDF maps are the simplest to use. We provide three static maps for each SE priority block, one with satellite imagery, one with roads, and one with topographic information. These maps provide guidance on land access, habitat diversity, water bodies, topography, and block boundaries and can be downloaded from the interactive mapping tool used to sign up for blocks (blocksignup.ncbirdatlas.org).

These PDF maps are also georeferenced and can be loaded into some GPS applications such as [Avenza](#) so you can see your field location plotted directly on the block map. Note that at the bottom of each map there is an active link that takes you to the data already submitted for each block.

Sign Up for a Priority Block

If you are excited about atlasing a particular area and want to ensure it gets adequate coverage, you can sign up to be the Primary Atlaser for a specific block. By signing up for a priority block you are agreeing to:

- Nearly 20 person-hours surveying within the block for birds during the spring and summer, attempting to confirm breeding for as many species as possible,
- Roughly 5-10 person-hours surveying through the winter for species presence and abundance,
- Regularly submitting your data through the *NC Bird Atlas eBird portal*, and
- Providing additional documentation for rare or priority species.

Serving as Primary Atlaser does not prevent someone else from reporting birds in that block but serves to help us more evenly distribute effort.

We encourage enthusiastic, experienced birders to sign up for multiple blocks (particularly blocks difficult to access) in the same year. If you are a beginning birder and not yet comfortable with your ability to identify birds, consider joining with a more experienced group or partner in the first year to help you gain experience.

Priority Block Sign-up Process

Go to the ncbirdatlas.org and click on the [Priority Blocks Link](#). Use the interactive map to see which blocks in your region are targeted for priority surveying, all unclaimed priority blocks are identified by BOLD blue lines. (Red boxes indicated the priority block has already been adopted).

- Click on the priority block you wish to adopt – make a note of the **block name**.
- Utilize the additional maps (Topo, Streets, Satellite) provided to identify the area boundaries.
- Click “Sign-up” under status line to adopt the block. Please note that if there is not a sign-up link then the block has been taken or it is not a priority block.
- Complete the Google doc for your desired priority block by selecting the block name from the drop-down list.
- A confirmation email will be sent to you upon successfully adopting the block.

General Atlasing

You can atlas in any priority block whether you are the Primary Atlaser or not! You still need to be aware of the block boundaries and submit your data through eBird, using the NC Bird Atlas Portal, so that your effort will contribute to completing the block(s) in which you survey. All the data you submit will show up on eBird and be compiled for each block so you can see what other species were observed, what type of behaviors were observed, and even when and where those observations took place. The Primary Atlaser will monitor the observations submitted by everyone within a priority block and fill in any gaps.

You may also atlas in non-priority blocks. This will most commonly happen if you live or work in a block, or know about a rare bird breeding somewhere that you want to document for the atlas.

Incidental Observations

Incidental observations are those made while doing something other than birding, such as gardening, driving, or hiking. These observations are an especially important source of bird data for habitats or species that may otherwise receive less survey coverage. However, it is very important that all observations be precisely plotted.

Block Completion Guidelines

All Primary Block Atlaser should consult with the [regional coordinator](#) on whether the priority block has been adequately surveyed. However, we offer the following guidelines for Primary Block Atlasers to monitor block completions.

Spring and Summer Surveys

- Roughly 20 hours of daytime birding in the SE priority block.
- 50% of reported bird species marked as "Confirmed".
- All accessible habitats within the priority block have been surveyed.
- At least two (2) hours of nocturnal (nighttime) birding ([see safety guidelines](#)).
- At least three separate visits, spread out to document early and late breeders.

Winter Season

- Roughly 5-10 hours of daytime birding in the SE priority block.
- At least two separate visits should be made to the block and its habitats, one each in both early (Nov 1-Dec 31) and late (Jan 1-Mar 1) winter.
- All accessible habitats have been surveyed with particular focus on the following:
 - Inland lakes and ponds
 - Coastal shorelines, estuaries, and sounds

- High tide roosts
- Early successional and edge habitats
- At least two (2) hours of nocturnal (nighttime) birding ([see safety guidelines](#)).
 - It is generally advisable to avoid surveying during dusk and dawn when birds can be moving to and from roosts, which can make it difficult to assign them to the appropriate block.

When priority blocks are completed for the NC Bird Atlas, they will be marked on the map as COMPLETE, and Primary Atlasers should consider signing up for other priority blocks.

Survey Methods

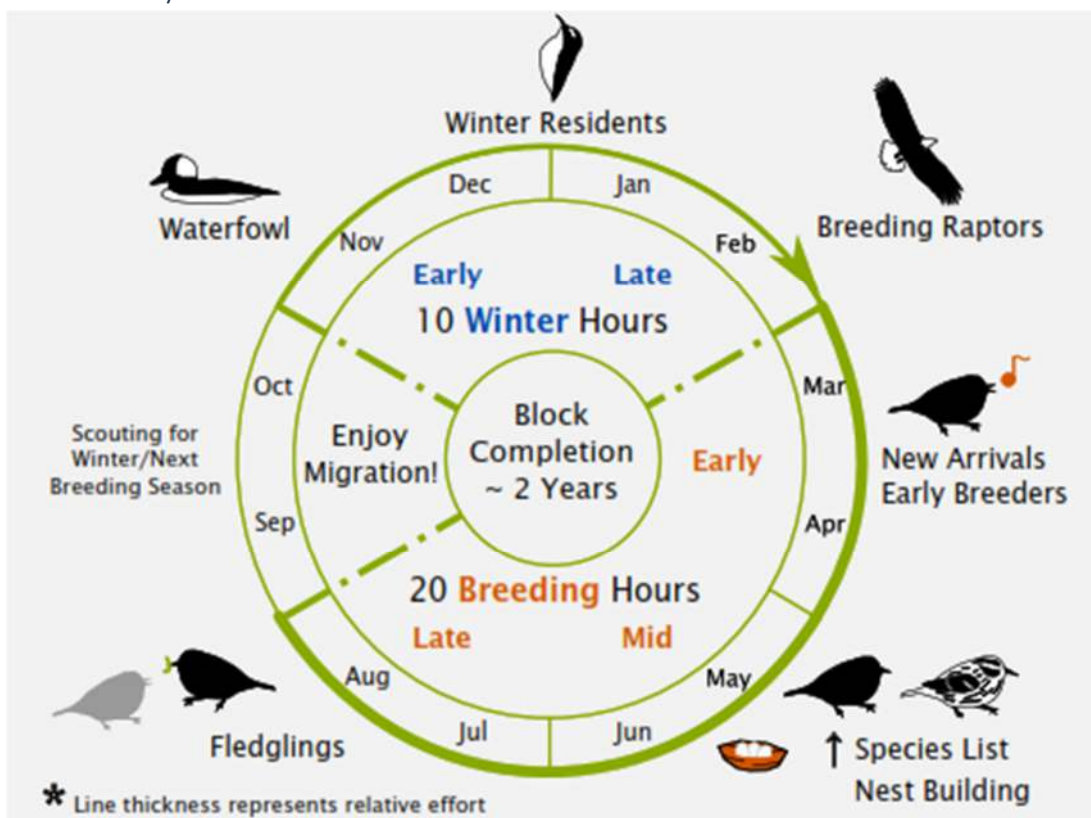
Your objective as an Atlaser is to locate, identify, and count the most species in a block and confirm breeding for as many of those species as possible. Each species needs to be confirmed only once in a block. For example, one Red-winged Blackbird nest found in a block means Red-winged Blackbird is confirmed for that block for the entire 5-year period of the atlas. However, we strongly encourage you to submit checklists of all birds you observe and note all breeding behaviors every time you are afield; you just won't have to specifically seek out any additional breeding Red-winged Blackbirds.

To get started, we suggest the following:

- Create an eBird account and select the NC Bird Atlas Portal. Learn how to enter data in the NC Bird Atlas portal on eBird. See the Data Entry section for data entry using the eBird mobile app.
- Obtain all necessary materials from the Atlas website. Familiarize yourself with this handbook, breeding codes, and data forms.
- Familiarize yourself with the birds. Use the Explore Regions tool on eBird to review the species that occur in your area. Review bird identification materials including audio of bird songs and calls.
- Determine a priority block to survey in your area by visiting the [Block Sign-up Map](#). You may wish to team up with others to survey a block, particularly if you are new to birding or atlasing.
- Obtain a map of the priority block and study it carefully to familiarize yourself with block boundaries, roads, access points, and major landmarks. These will help you navigate around the block and determine the different types of habitats that need visiting. It is important to survey representatives of each major habitat type present in the block.
- Scout your block This allows you to assess the landscape and condition of the roads, begin seeking landowner permission, and determine the number and extent of habitat types in the block. It is best to obtain permission to enter private property sometime before the day you actually plan to survey for birds. Place the Volunteer Vehicle Sign on your dash while driving slowly or parking.

- Finally, with binoculars ready, ears attuned, and field guide nearby, it's time to start counting birds!

When to Survey



Spring and Summer Season

During this time of year Atlasers will see the peak of the breeding season for most species, which goes from April to August. May and June are the primary months for building a species list for a block because most birds are on territory and very vocal. July and August are the optimal months for recording birds in the 'Probable' and 'Confirmed' categories (see Breeding Codes). Although most singing activity has decreased, it is a time when noisy fledglings accompany parents or beg for food in a nest, and adults are more likely to be seen carrying food for young. Also, species that produce multiple broods are busy with their second or even third brood.

Daytime Surveys

The best time of the day to plan your visits during the spring/summer is from about dawn (5–5:30 am) to midmorning (9–10 am). The majority of birds are most active and easier to confirm during this period. Crepuscular (active at twilight or just before dawn)

species will require visits in the early evening or at dawn. Rails and bitterns are easiest to detect right before dawn and after dusk.

Nocturnal Surveys

Enter separate checklists for daytime and nighttime observations. The eBird system marks a checklist as nocturnal if it occurs 40 minutes before sunrise or 20 minutes after sunset. Take extra precautions to ensure your personal safety.

North Carolina is home to crepuscular (active at dawn and/or dusk) and nocturnal species that can be detected if volunteers devote some time to surveying before dawn or after sundown. Species such as Great Horned Owl, Eastern Screech Owl, and Barred Owl may be opportunistically detected during routine daytime atlasing. However, others like Chuck-Will's Widow and Whip-poor-will are unlikely to be detected without nighttime effort.

Scope out your block for suitable nesting habitats based on the species that are likely to occur in your area and survey at the appropriate time. Species Survey Strategies will be posted on the atlas website. It is difficult to confirm breeding for these species, so 'Probable' evidence is sufficient. Do not risk excessive disturbance to 'Confirm' them or any other species.

Winter Season

North Carolina is home to many species of greatest conservation need during the winter months. When this period begins and ends will vary by species and can even change from year to year. Our efforts will allow us to better understand this dynamic process in the life cycle of many species.

Most birds are not as territorial during the winter and can move about more freely, often in mixed flocks, in search of food. Therefore, it is recommended that you spread your effort out over multiple visits over the course of the entire season. At this early stage of the atlas, we are dividing the winter into two periods: early (November 1-December 31) and late (January 1-March 1). We expect this to provide us with the most comprehensive picture of bird distribution and their relative abundance during the winter.

We have identified several habitats that we recommend you focus your atlasing on:

1. Inland lakes and ponds.
 - Counts should include all geese, swans, ducks, grebes, coots, shorebirds, gulls, loons, cormorants, herons, and kingfishers.
 - Birds of prey are sometimes drawn to waterbodies to hunt, so be looking for osprey, eagles, hawks, harriers, falcons, or owls!
2. Coastal shorelines, estuaries, and sounds

- Counts should include all geese, swans, ducks, grebes, coots, shorebirds, alcids, gulls, terns, loons, gannets, cormorants, herons, kingfishers, and any rarer seabirds.
 - Birds of prey are sometimes drawn to waterbodies to hunt, so be looking for osprey, eagles, hawks, harriers, falcons, or owls!
3. High tide roosts
 - For coastal blocks with marshes, high tide can be an exciting opportunity to observe birds congregating in slightly higher and drier sites.
 4. Early successional and edge habitats
 - Many species use dense vegetation found in fallow fields, old clear-cuts, and along edges—an often abrupt change where two different habitats meet.

Where to Survey

It is most useful to split the block into several separate areas by habitat type (e.g., a beaver pond, a swamp forest, marsh, or open field). Submit an eBird checklist for every visit, starting a new checklist if you enter a new habitat type. There is a balance between the amount of work it requires to keep separate checklists and the value of these checklists, but we suggest you give this a try and before long you will likely find it is second nature to start a new checklist for a new sublocation.

We recommend traveling checklists not exceed **1 mile in length**, because the farther the birds were from the point you plotted on the map, the less useful it is. All data will be summarized to at least the block level for priority blocks but keeping separate lists gives information on habitat associations and provides more precise information for rare species, which is critical information for land managers. Although eBird allows you to 'Select a central block point' when entering an Atlas checklist, we strongly encourage you to create your location with a more precise location (see [Mobile App data entry guide](#)), which not only provides more useful data, but will help you keep track of which specific location you have encountered specific species and allow you to upgrade species' behaviors accordingly (see Breeding Codes).

There are few exceptions to plotting your observations as precisely as possible. You might use this option if you were driving by on the highway and saw an Osprey nest and you are confident about the block it was in but not exactly sure in which location within the block. The 'Select a central block point' location may be useful in these cases.

Documenting Priority Species

Sensitive Species

Some species are particularly sensitive to disturbance, especially at the nest site, and attract disproportionate attention from birders, photographers, and the public. We have made sure

that records of the most sensitive species will be hidden from public output on eBird. These species and the time of year they are hidden are as follows:

- Black Rail (year-round),
- Red-cockaded Woodpecker (year-round)

If you are concerned about a specific bird or nest and the species is not listed above, there are additional actions you can take. You can choose to [hide your checklist](#) from the public. This hides your checklist from the public **and** from the NC Bird Atlas data, so we request that you unhide the checklist after the birds have left the area. Advanced users can also make their checklists harder to find by changing their data privacy settings to hide their checklists from recent visits, eBird alerts, and top 100 lists.

Rare Species

The Atlas provides a great opportunity to learn more about some of the rare, secretive, or high conservation priority bird species in the state.

To maintain high data quality and provide useful information for management, there are some species for which we will request more detailed information (Appendix C). This extra detail can most easily be achieved by:

1. Starting a new, stationary checklist at the site of the encounter.
2. Including notes on the habitat and behavior of the bird, including but not limited to identification marks you used to identify it.
3. Collecting physical documentation, such as photos or vocal recordings.

Rare species will often be flagged in eBird, so in many cases this should help remind you to provide these additional details. It is worth noting that some species may not necessarily be rare in North Carolina, but they rarely breed in the state.

All checklists and rare breeders and species should be submitted in a timely fashion to avoid duplication of effort and so we can schedule follow-up visits to rare breeders if warranted.

Lastly, we are preparing Species Survey Strategies (Appendix D) to assist you in looking for some of these species. These documents will provide instructions for some of the special species you should be searching for based on habitat and region, and the optimal time of year and methods to seek them. You can also consult with your Regional Coordinator. Strategies to assist you in looking for some of these species. These documents will provide instructions for some of the special species you should be searching for based on habitat and region, and the optimal time of year and methods to seek them. You can also consult with your Regional Coordinator.

Data Entry

We recommend you use the eBird mobile app to collect your atlas data. It records the distance you covered, how long you were atlasing, and the precise starting location for each location

without you needing to estimate. However, we also realize that some folks prefer the traditional approach of paper and pencil and entering into eBird later, so we have a downloadable block datasheet and some data entry tips for you.

First, enter your data soon after your atlas outing. Data entry is easier and most accurate when the event is still fresh in your mind, rather than weeks or months later. It also provides more follow-up opportunity for rare species you find, and makes sure other observers know an area has been covered so they don't unknowingly repeat your atlas efforts. Second, review the data you entered. Transcribing records increases the probability of an error. Reviewing entries helps minimize those errors. Finally, keep good notes while in the field. Record numbers of each species, what habitat you were in, what your route was (perhaps mark it on a printed block map), and comments on unusual species or behaviors. These notes can be useful for jogging your memory when you enter your data and provide valuable additional information on your sightings.

Using the Atlas Portal

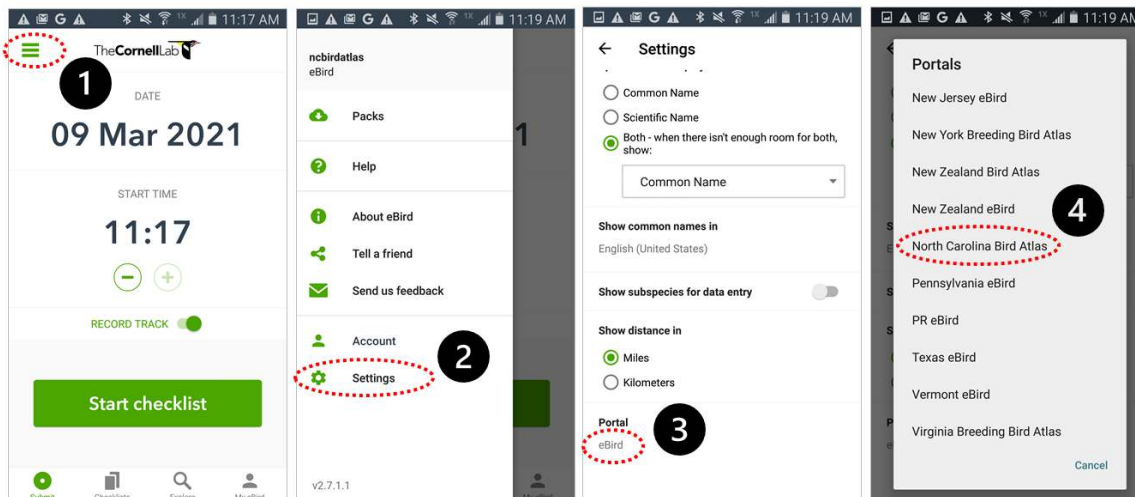
All atlas data should be submitted through eBird using the "North Carolina Bird Atlas" portal. As a general rule, use the atlas portal at all times during the next 5 years when you are following block boundaries on your checklists, and when you are keeping an eye out for breeding behaviors and reporting them.

All the data you enter will be in your single eBird account, but when you enter data on the atlas portal you are indicating that you are familiar with the atlas protocols and know where the block boundaries are. This is important for ensuring the quality of the data we collect. See the tutorials on the NC Bird Atlas website (ncbirdatlas.org) for how to get starting using eBird.

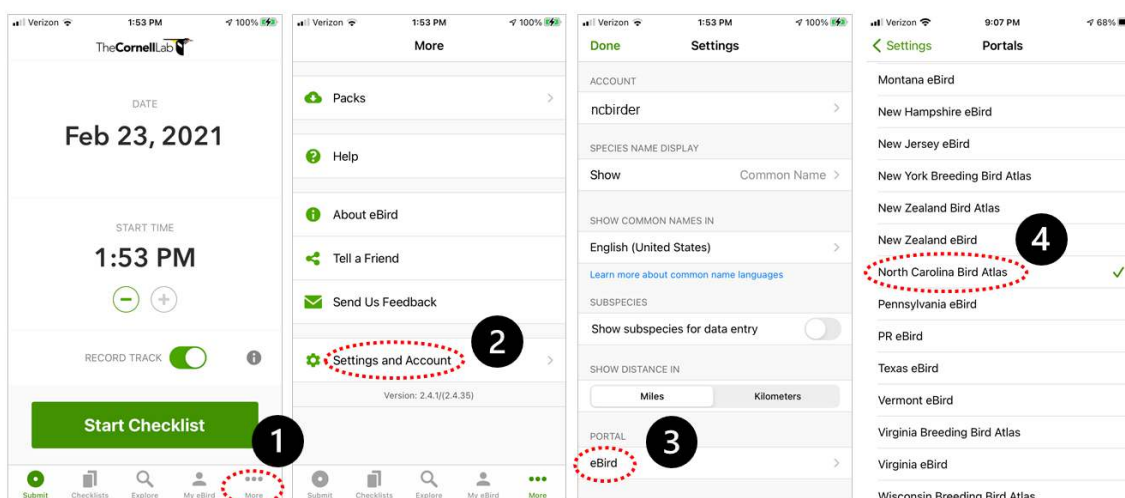
Mobile App

If you use the mobile app and enter your data while you are in the field (**recommended**), you will need to change the portal in the app settings.

On **Android**, go to the Menu icon (three stacked, horizontal lines) on the app home page and then go to "Settings." Find the portal section and use the drop-down list to select "North Carolina Bird Atlas."



On **iOS**, use the More icon (three dots) and then go to “Settings and Account.” Find the portal section and use the drop-down list to select “North Carolina Bird Atlas.”



We recommend defaulting to the atlas portal for the entire project period. If you submit a checklist to the wrong portal, you can change the portal on the website by going to your checklist and then under the “Checklist tools” use the “Change portal” option.

Paper Data Forms

If you prefer to use the website to enter data, there is a [field checklist](#) you can print and fill out in the field. When you get home, enter data at ebird.org/atlasnc.

Breeding Behaviors

Determining which birds are breeding in a region is what separates atlasing from general birding efforts. As mentioned before, your goal in atlasing is to observe and report specific

behaviors that provide differing levels of evidence that a species is breeding in a block. Breeding behavior is classified into one of four categories, sorted by the strength of the evidence:

- Confirmed breeding (strongest evidence)
- Probable breeding
- Possible breeding
- Observed (no evidence of breeding)

There are multiple behaviors that fall under each of the four categories. **They are described in the Appendix A.** While atlasing, assign behavioral observations to the appropriate code. Your goal during atlasing is to confirm breeding for as many species as possible while minimizing disturbance of the birds. It is not necessary to find actual nests; other 'Confirmed' codes are easier to document, such as carrying nesting material (CN), carrying food (CF), and recently fledged young (FL).

Enter breeding behaviors every time you go atlasing. Enter breeding codes for all species whenever you observe breeding behavior. By reporting the highest code (highest strength of evidence) each time you observe breeding behavior, you're collecting valuable information about not just *where* birds breed, but also *when* birds breed.

Upgrading Codes

When atlasing, look not only for new species in your block, but also try to upgrade the breeding evidence for species you had previously recorded. Upgrading occurs when a code for a species is entered at a higher level than previously recorded. Upgrading may occur either within a category, such as from P (pair observed) to A (agitated behavior) in the 'Probable' category, or from one category to a higher one, such as C (courtship) in the 'Probable' category to NB (nest building) in the 'Confirmed' category.

On every checklist you submit, record and enter the highest possible breeding code for each species you observed.

Overall, try to build a good species list rather than trying to confirm everything. Meaningful distribution maps can still be drawn with high species counts in the 'Probable' and even the 'Possible' categories. Don't waste time confirming abundant species when you could be examining additional habitats; you will probably confirm most of the common species without even trying. One exception is for uncommon to rare species—upgrading to 'Probable' or 'Confirmed' is important and efforts to do so are not only warranted but encouraged. If you don't think you'll have time to follow up promptly on a potentially rare breeding record, please contact your Regional Coordinator immediately so they can find someone who can.

The block data on eBird shows the highest breeding code for each species so you aren't expected to keep track of this. However, for blocks you visit regularly, we recommend manually filling out a Block Summary Card (coming soon) between survey visits to help you keep track of which species you could upgrade on your next trip in the field.

Estimating Abundance

The primary objective of the Atlas is to collect breeding evidence for each species within a block. However, an estimate of the number of individuals seen will greatly increase the value of the Atlas for conservation planning and future comparisons of population change.

Imagine if John James Audubon had noted only "the Passenger Pigeon is present" rather than estimating that in one flock, over 300 million birds flew by him each hour!

Record the total number of birds you saw or heard for each species on all eBird checklists. If you did not record the actual number in the field, it is acceptable to make an educated guess provided it is reasonably close to accurate. Although it's allowable to include an X on your checklist to indicate a species was present, it is highly preferred that you estimate the number of birds seen for each species. The difference between "X Great Blue Herons" and "30 Great Blue Herons" nesting or "X Prothonotary Warblers" and "5 Prothonotary Warblers" singing provides important information about bird distribution, relative abundance, and quality of habitat near your checklist location. The number of birds entered on the checklist should represent the total number of birds seen or heard, NOT a projected estimate of how many may have been present and gone undetected.

Volunteer Hours

Your in-kind contributions to the atlas allow us to receive matching grant money. It is very important that you set up your eBird account and use the North Carolina Bird Atlas portal, so we can pull your volunteer survey time every 6 months. At the end of June and December the Bird Atlas Coordinator will compile and send you a document of your survey times pull from eBird. You will be asked to review this document for accuracy and return it to the Coordinator for submission to the Federal Grant.

Atlas Ethics

Birdwatching is a growing hobby and with the increase in birders comes an increase in the potential for disturbing birds, habitats, and people. In addition to the following guidelines, the American Birding Association's [Code of Birding Ethics](#) also provides guidance for birders.

Respect for Birds

Birds are living creatures that deserve our respect. Be considerate of the needs of nesting birds. The survival of nestlings is paramount.

- Be quiet and unobtrusive. Try to observe the birds so they are unaware of your presence and behave normally. Avoid quick movements, unnecessary noise, running, continuous chasing of the same individual, throwing things, tree-whacking for cavity nesters, "pishing," etc. Ideally, the birds should behave normally and not be aware of your presence during the observation periods. The quiet observer sees more!

- Approaching a nest too closely or repeatedly flushing adults during certain stages of the nesting cycle may cause nest abandonment. Visiting a nest site may attract predators (avoid leaving a single, dead-end scent trail to a nest). Do not handle the young or eggs. Remember, a single criterion from the 'Confirmed' category is sufficient evidence to note a 'Confirmed' record. In most cases, breeding can be confirmed without approaching a nest by observing from a distance. If the adult birds are agitated or do not return within 10 minutes, you may be too close and should move farther away from the nest.
- Audio playback can be useful for detecting birds but may also have negative effects on birds by causing them to expend energy defending their territory against a phantom intruder. Because we are seeking breeding birds during the time of year when they are defending their territory and tending to their mate or young, playback has the potential to be more disruptive than for migrant or wintering birds. Audio playback can be detrimental to the health and breeding productivity of birds. Therefore, we do not condone playback for most general atlasing purposes and playback is strongly discouraged for any non-scientific use.
- Use discretion in divulging information on threatened and endangered species. Use the Hide function in eBird for any species that may be highly sought-after and sensitive to disturbance. The Atlas will not publish exact locations for these species.

Respect for Habitat

Damage to a habitat affects all species in the ecosystem. Keep disturbance to a minimum.

- Do not disturb vegetation near a nest and avoid trampling sensitive habitats.
- Carry out your litter. If possible, also carry out litter left by others.
- Keep motor vehicles on established roads and parking areas. One set of tracks invites others.

Respect for People

Remember that much of the Atlas fieldwork will be conducted on private property, so it is necessary to exhibit certain courtesies.

- Always obtain permission to enter private lands.
- Do not block rights-of-way and always leave gates as you found them.
- When birding near a private residence, be considerate of your host's time, property, and privacy.
- Behave in a manner that reflects favorably on the organizations that you represent.
- Respond to questions about your activities with courtesy and respect.
- Display a volunteer sign on your car or provide landowners with a handout.

Field Safety

Please be safe when in the field. Your safety is more important than a bird survey. Atlasing is

not a particularly dangerous activity, but any time you are out in the field it pays to be alert, be prepared, and use common sense.

Support the Atlas

You can support North Carolina Breeding Bird Atlas in other important ways.

- Make a direct contribution through our online donation button (NCBirdAtlas.org).
- Purchase merchandise from our [online store](#). We receive a royalty on all purchases. Then advertise your support by showing off your new gear!

Appendix A: Breeding Codes

Observed

No code, checklist in atlas portal: Species present but without evidence of breeding and outside of suitable nesting habitat. No code is required. Any bird you enter on your checklists in the atlas portal without a breeding code are automatically 'Observed.'

- Shorebirds that normally breed in the arctic.
- Herons or egrets (colonially nesting species) observed away from a nesting colony (does not include Green Heron and bitterns).
- Gulls frequenting dumps, plowed fields, lawns, etc., throughout the summer.
- A Marsh Wren singing from a dry grassy field.
- Highlight a species with big overlap between migrants and breeders example here? Like Goldfinches?.
- Regionally rare individuals in an unsuitable habitat.

F – Flyover: Birds flying high overhead or in direct flight. This is a behavior code that doesn't indicate breeding, therefore it is in the 'Observed' category. Tree Swallows and other species foraging for insects are not considered a flyover because they are not in direct flight. Please see the eBird help pages for more detail.

- Turkey Vulture soaring high overhead.
- Great Blue Heron flying above treeline.

Possible

H – In Appropriate Habitat: Adult in suitable nesting habitat during its breeding season. Note that this code has both a habitat and breeding season component, which can be very different for residents vs migrants.

- Virginia Rail observed stalking in a marsh.
- Scarlet Tanager feeding in a deciduous forest.
- Bobolink observed once in an abandoned field.
- Loons, cormorants, or ducks in adult plumage summering on a lake with suitable breeding habitat, but no courtship display or young observed.
- Green Heron or bitterns (non-colonial nesting species) observed in appropriate nesting habitat.
- A Mourning Dove at a backyard feeder with suitable nesting trees nearby.
- A Black-capped Chickadee giving the *chick-a-dee-dee* call.
- Tree Swallows actively foraging above suitable habitat.

S – Singing Bird: Singing bird present in suitable nesting habitat. This code is also used for non- songbirds giving their primary vocalization, such as woodpecker drumming, owl calls, rail vocalizations, and woodcock peenting. In some species, both males and females sing (e.g.,

Northern Cardinal, Bicknell's Thrush). If a bird is heard singing at the same place on a second trip during the breeding season, it may qualify as S7 – Singing Individual Present 7+ Days.

- Rails heard in marsh early in breeding season but not relocated on subsequent visits.
- Second-year male American Redstart singing an abnormal song in a hedgerow in early June.
- Woodpeckers drumming. Woodpecker drumming is analogous to singing. Note: It takes a considerable amount of experience to reliably identify woodpeckers by their drumming.
- An Eastern Screech-owl calling from your backyard.

Probable

S7 – Singing Individual Present 7+ Days: Singing male/female present at same location on at least two occasions 7 or more days apart. Do not use if you observed the species singing a week earlier elsewhere in your block. This behavior presumes a permanent territory. This code should only be used if the initial observation was made after migration ceased. Observations must be made within the same breeding season; observations from different years do not apply.

- A Pine Warbler singing from the same group of pines two Saturdays in a row.
- A Barred Owl calling for over a week from the same patch of forest.

M – Multiple (7+) Singing Males: Multiple (7 or more) singing or territorial birds of a species detected within a block within a single breeding season. If you are submitting separate checklists for different locations and habitats in your block (recommended) and you don't have all 7 birds on a single checklist, use this code on the checklist where you reach a total of 7 birds and make a note in the comment field that you are including birds from other checklists in the block.

- Rose-breasted Grosbeaks heard in 7 different forest patches in a block throughout June and July.
- 8 Song Sparrows observed in a block in one day.

P – Pair in Suitable Habitat: Pair observed in suitable nesting habitat. Only use this code when you are fairly certain that a mated pair of birds has been observed. Look for behavioral cues to determine if you have a male-female pair, particularly in species where males and females look the same.

- Male and female Scarlet Tanagers observed together several times in the same area but no nest is found.
- Two Mourning Doves sitting next to each other on a branch, cooing, and preening each other.

T – Territorial Defense: Permanent territory presumed through defense of breeding territory by fighting or chasing. While this is generally used for individuals of the same species, an interaction between members of different species may fall under this code when it appears to be territorial defense. Also see “A – Agitated Behavior.” Because territoriality involves the defense of a fixed area, it may be useful to map locations of individuals to determine if they are defending the same general area when surveying the block on future visits.

- A Field Sparrow chasing another Field Sparrow in a grassy field.
- Two American Robins fighting in your backyard.
- A Swamp Sparrow chasing a Marsh Wren.

C – Courtship, Display, or Copulation: Courtship behavior or copulation between a male and female. Courtship behavior includes transfer of food, displays, and grooming between a pair of birds.

- American Woodcock display flights.
- Ruffed Grouse drumming.
- Common Nighthawk booming.

N – Visiting Probable Nest Site: Repeated visits to a probable nest site. This is especially useful for cavity nesters or for a shrub-nesting species that flies into the same thicket and disappears on several occasions.

- A male Northern Cardinal flies into a dense shrub and doesn’t come out for several minutes.
- A Carolina Chickadee entering a tree cavity and not coming out for some time.

A – Agitated Behavior: Agitated behavior or anxiety calls from adults indicating a nest site or young in the vicinity. This code refers to a stronger reaction to intruders than those exhibited by “T – Territorial Defense,” usually against brood parasites, nest predators, and humans. Do not use this code for agitation induced by “pishing” or playing recordings. This code also excludes mobbing behavior that species engage in year-round (e.g., mobbing an owl).

- A House Wren begins chattering loudly from a bush as you walk by.
- Common Yellowthroat scolding a Brown-headed Cowbird.
- A mixed flock of birds mobbing a Blue Jay during the breeding season.
- Red-winged Blackbird or Eastern Kingbird attacking a Great Blue Heron.
- A Cooper’s Hawk or Common Tern dive bombing you.

B – Woodpecker/Wren Nest Building: Nest-building by wrens or excavation of cavities by

woodpeckers. Wrens may build “dummy” nests before the female selects a nest. Woodpeckers often drill holes for roosting.

- Male House Wren stuffing a nest box with sticks.
- Hairy Woodpeckers building a cavity in April.

Confirmed

PE – Physiological Evidence: Physiological evidence of breeding based on a bird in the hand. This code is used primarily by bird banders and includes evidence such as a highly vascularized swollen incubation (brood) patch, cloacal protuberance, or an egg in the oviduct.

CN – Carrying Nesting Material: Adult carrying nesting material to an unseen nest, such as sticks, grass, mud, and cobwebs. For raptors, be sure the material is not simply incidental to prey capture/transport. For wrens, use B.

- Vesper Sparrow flying with a bill full of grass.
- Northern Parula collecting lichen and then flying away with it.
- Barn Swallow collecting mud and then flying off toward a barn.

NB – Nest Building (not wrens or woodpeckers): Nest-building observed at the actual nest site, excluding wrens and woodpeckers.

- Canada Goose moving reeds around and adding mud to build up its nest.
- Warbling Vireo weaving cobwebs into its nest.

DD – Distraction Display: Distraction displays and injury feigning in attempt to draw intruder away from nest or young.

- Killdeer doing broken-wing distraction display but no young seen.
- Ovenbird running about with wings fluttering.
- Ruffed Grouse using a broken-wing display to protect her brood.

UN – Used Nest: Used nest found, but no adult birds seen nearby. Use *only if the nest was used during the Atlas period* and you are *certain* of the species. Add comments detailing how you identified the nest. Do not collect the nest, but do take a photograph if possible. Enter ‘0’ if no individuals of that species are observed during your visit.

- A large ground nest in the woods with several large Wild Turkey eggs in it.
- Baltimore Oriole nest with no activity but the nest is still in good shape.

ON – Occupied Nest: Occupied nest indicated by adult sitting in nest in incubating position, adult entering nest site and remaining, or exchange of incubation duties by the pair. This code is useful for nests high in trees, on cliffs, and in chimneys where the contents of the nest and incubating or brooding adult cannot be seen.

- Wood Thrush seen on nest for an extended period of time but nest too high to see contents.
- Chimney Swift seen flying into a chimney and doesn't leave for a long time.

FL – Recently Fledged & Precocial Young: Recently fledged or downy young still dependent upon adults and presumed incapable of extended flights from nest site. Look for retained downy feathers, a yellow gape, a short tail (shorter than the wings), clumsy flight and landings, and a bird incapable of feeding itself. Beware of family groups late in the breeding season which may still be interacting but are far from the breeding location. Young cowbirds begging for food confirm both the cowbird and the host

species. If you find a dead fledgling and don't see an adult of the same species, use a count of '0' and enter the FL code.

- A stubby-tailed juvenile cardinal incapable of sustained flight.
- Common Loon chicks riding on the back of an adult.
- Young Common Tern chicks at the nesting site and incapable of flight.

CF – Carrying Food: Adult carrying food for young or incubating partner. This code should not be used for corvids, raptors, terns, and other species that regularly carry food for courtship, caching, or other purposes. One of the best signs to look for is the repeated carrying of food in the same direction.

- A Hermit Thrush with a bill stuffed full of insects.
- Yellow Warbler carrying a fat green caterpillar.

FY – Feeding Young: Adult bird feeding young that have left the nest. This code should not be used for species that may move many miles from the nest site, such as raptors and terns. Use the NY code for nestlings being fed by an adult.

- Eastern Bluebird feeding a begging juvenile in a tree near probable nest site.
- A Black-capped Chickadee feeding chicks in a hemlock tree.

FS – Carrying Fecal Sac: Adult carrying fecal sac or egg shell fragments. Many passerine adults keep their nests clean by carrying membranous, white fecal sacs and broken eggshells away from the nest. Note that only songbirds and woodpeckers produce fecal sacs and this code should only be applied to these groups of species.

- Common Grackle flying out of a shrub with a white fecal sac.
- Carolina Wren carrying an eggshell out of its nest.

NE – Nest with Eggs: Nest with eggs. Be careful not to disturb the vicinity of the nest. Confirm the species by waiting at a distance until adult returns. If no birds are seen, use the UN code. If a cowbird egg is found in the nest, use code NE for both the cowbird and the host species; if no individual Cowbirds were seen that day, then enter a "0" in the Brown-headed Cowbird number field during data entry.

- American Robin nest with blue eggs in the low branches of an apple tree.
- Northern Cardinal nest with blotchy eggs in the bushes outside your home.

NY – Nest with Young: Nest with young seen or heard. Keep your distance so nestlings are not prematurely flushed from the nest. Include the nestlings in your species count. Presence of cowbird young confirms both the cowbird and the host species.

- Eastern Phoebe or House Finch nestlings under the eaves of a house.
- Young Osprey calling from a nest platform.

Common Breeding Code Errors

Though we have tried to be clear and thorough in our breeding code guidelines, there are certain codes that have been identified as frequently misused/particularly confusing by past atlases:

F = Flyover should only be used when the bird is flying overhead but not using the habitat. It should not be used when an individual is flying from different perches, for example. If in doubt, it is better to not use this code. Another way to think about it is whether or not you expect to see that species in the habitat you are currently in. For example, if you are in a forest and see a Double-Crested Cormorant flying overhead, this would be labelled as an **F**.

T = Territorial or **A = Agitated**? Territorial generally applies to aggressive interactions between individuals of the same species, whereas Agitated generally applies to anxious calls/behavior in response to the presence of another species, specifically, brood parasites, nest predators, or humans (EXCLUDING "pishing" or playback).

S = Singing Bird OR **S7 = Singing Individual Present > 7 Days** only applies to species that have songs associated with breeding. Thus, it does NOT apply to:

- Ducks, Geese
- Shorebirds, Terns, or Gulls
- Wading Birds
- Pigeons

- Jays, Crows, Ravens

Many species make vocalizations that are not associated with breeding. These can be actual songs (e.g. nuthatches), but we typically think of them as calls (e.g. Killdeer or Kingfisher vocalizations). If these calls are detected, they should be labelled as **Observed** (i.e. blank breeding code in eBird), and never as **S** or **S7**.

Other examples include:

- Cedar Waxwing
- Common Nighthawk (swoops/dives count as **S**)
- Swallows and Swifts (Barn Swallows do sing, but observers would need to be able to distinguish song from call)
- Blue-gray Gnatcatcher (Call frequently, sing on rare occasions)
- Woodpeckers (Woodpecker drumming CAN be coded as **S** if the species can be identified)

P = Pair in Appropriate Habitat rarely applies to species that are sexually monomorphic (i.e. males and females cannot be reliably distinguished from each other in the field based on size and/or plumage characteristics,

Examples include:

- Crows and Jays
- Gulls and Terns
- European Starlings

B = Repeat visits or nest-building by woodpeckers, wrens, chickadees, titmice, and kingfishers.

- The species listed above use cavity or dummy nests and are the only species for which **B** can be used.

NB = Nest building refers **ONLY** to species that actually build nests, including those species (bluebirds, swallows, etc.) that use nest boxes. Cavity nests **DO NOT count**.

Does NOT apply to:

- Woodpeckers, including flickers and sapsuckers
- Wrens
- Chickadees or Titmice
- Vultures
- Brown-headed Cowbird

CN = Carrying Nest Material does not apply to species that regularly carry materials which may be associated with tool use, food caching, or building roosting cavities, but NOT with nesting.

Species for which this code rarely applies to:

- Crows
- Vultures
- Brown-headed Cowbirds
- Nightjars
- Woodpeckers and Wrens
- Wood Ducks and Mergansers

CF = Carrying Food for nestlings and juveniles does not apply to species that may be carrying food for courtship or to eat at a different perch.

Examples include:

- Gulls and Terns
- Corvids
- Hawks, Falcons, Eagles, Osprey (It is possible for raptors be carrying food back to the nest for the young, so only use if you can confirm they are carrying food back to a NEST with YOUNG.

Appendix B. Rare Species List

When encountering any of the following species, we encourage you to:

2. Start a new, stationary checklist at the site of the encounter.
2. Include notes on the habitat and behavior of the bird, including but not limited to identification marks you used to identify it.
3. Collect physical documentation, such as photos or vocal recordings.

Common Name	Scientific Name	Conservation Priority*	Knowledge Gap	Management Concern
American Bittern	<i>Botaurus lentiginosus</i>	SGCN	Yes	
American Oystercatcher	<i>Haematopus palliatus</i>	SGCN		Yes
Bachman's Sparrow	<i>Peucaea aestivalis</i>	SGCN		
Bald Eagle	<i>Haliaeetus leucocephalus</i>	SGCN		Yes
Barn Owl	<i>Tyto alba</i>	SGCN, Global	Yes	
Black Rail	<i>Laterallus jamaicensis</i>	SGCN	Yes	
Black Skimmer	<i>Rynchops niger</i>	SGCN		Yes
Black-bellied Plover	<i>Pluvialis squatarola</i>	SGCN	Yes	Yes
Blackburnian Warbler	<i>Setophaga fusca</i>	SGCN	Yes	
Black-crowned Night-Heron	<i>Nycticorax nycticorax</i>	SGCN	Yes	
Bobolink	<i>Dolichonyx oryzivorus</i>	SGCN, Global	Yes	
Caspian Tern	<i>Hydroprogne caspia</i>	SGCN		Yes
Cerulean Warbler	<i>Setophaga cerulea</i>	SGCN		
Clapper Rail	<i>Rallus longirostris</i>	SGCN	Yes	
Common Gallinule	<i>Gallinula galeata</i>	SGCN	Yes	
Common Raven	<i>Corvus corax</i>	SGCN, Global	Yes	
Common Tern	<i>Sterna hirundo</i>	SGCN		Yes
Eastern Painted Bunting	<i>Passerina ciris</i>	SGCN		
Glossy Ibis	<i>Plegadis falcinellus</i>	SGCN		Yes
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	SGCN		
Gull-billed Tern	<i>Gelochelidon nilotica</i>	SGCN		
Henslow's Sparrow	<i>Ammodramus henslowii</i>	SGCN		
Hermit Thrush	<i>Catharus guttatus</i>	SGCN, Global	Yes	
King Rail	<i>Rallus elegans</i>	SGCN	Yes	
Le Conte's Sparrow	<i>Ammodramus leconteii</i>	SGCN, Global	Yes	
Least Bittern	<i>Ixobrychus exilis</i>	SGCN	Yes	
Least Tern	<i>Sterna antillarum</i>	SGCN		Yes
Little Blue Heron	<i>Egretta caerulea</i>	SGCN		Yes
Loggerhead Shrike	<i>Lanius ludovicianus</i>	SGCN	Yes	
Marbled Godwit	<i>Limosa fedoa</i>	SGCN	Yes	Yes
Nelson's Sharp-tailed Sparrow	<i>Ammodramus nelsoni</i>	SGCN	Yes	
Northern Harrier	<i>Circus cyaneus</i>	SGCN, Global	Yes	

Northern Saw-whet Owl	<i>Aegolius acadicus</i>	SGCN		
Olive-sided Flycatcher	<i>Contopus cooperi</i>	SGCN, Global	Yes	
Peregrine Falcon	<i>Falco peregrinus</i>	SGCN		Yes
Piping Plover	<i>Charadrius melodus</i>	SGCN		Yes
Red Crossbill	<i>Loxia curvirostra</i>	SGCN	Yes	Yes
Red Knot	<i>Calidris canutus</i>	SGCN		Yes
Red-cockaded Woodpecker	<i>Picoides borealis</i>	SGCN, NC		Yes
Ruffed Grouse	<i>Bonasa umbellus</i>	SGCN		Yes
Rusty Blackbird	<i>Euphagus carolinus</i>	SGCN	Yes	
Saltmarsh Sharp-tailed Sparrow	<i>Ammodramus caudacutus</i>	SGCN	Yes	
Seaside Sparrow	<i>Ammodramus maritimus</i>	SGCN, NC	Yes	
Snowy Egret	<i>Egretta thula</i>	SGCN		Yes
Swainson's Warbler	<i>Limnithlypis swainsonii</i>	SGCN, Global	Yes	
Swallow-tailed Kite	<i>Elanoides forficatus</i>	SGCN	Yes	
Tricolored Heron	<i>Egretta tricolor</i>	SGCN		Yes
Veery	<i>Catharus fuscescens</i>	SGCN	Yes	
Vesper Sparrow	<i>Poocetes gramineus</i>	SGCN, Global		
Virginia Rail	<i>Rallus limicola</i>	SGCN	Yes	
Wayne's Black-throated Green Warbler	<i>Setophaga virens waynei</i>	SGCN	Yes	
Wilson's Plover	<i>Charadrius wilsonia</i>	SGCN		Yes
Wood Stork	<i>Mycteria americana</i>	SGCN		
Worm-eating Warbler	<i>Helmitheros vermivorus</i>	SGCN, NC	Yes	
Yellow Rail	<i>Coturnicops noveboracensis</i>	SGCN	Yes	
Yellow-crowned Night-Heron	<i>Nyctanassa violacea</i>	SGCN	Yes	Yes

*SGCN=Species of Greatest Conservation Need, NC=indicates the importance of North Carolina for species recovery, Global= species occurs in North Carolina in the periphery of its range, and is therefore rare in the state.

Appendix C. Species Survey Strategies

Nocturnal Atlasing Guidelines

Some species, such as owls, nightjars, rails, and bitterns, are cryptic species during the day. However, they vocalize or display at night and are best detected then. Ideally, each block should receive at least two nocturnal visits, one in early spring (for owls) and one in late spring or early summer (for nightjars and other species) and one in winter (for owls and other species), and each visit should be at least 1-2 hour long. If you are atlasing at night, please submit checklists for all of your effort, including checklists with no species.

Call playback is acceptable for nocturnal atlasing, but should not be overused. If possible, avoid atlasing on nights with strong winds (more than 10 mph), complete overcast, or rain. Calls and songs can be found at the Macaulay Library (macaulaylibrary.org) and xeno-canto (xeno-canto.org). Pairing a smartphone and a speaker will provide good results. A nocturnal trip's success is largely dependent on its timing.

Broadcast equipment

The broadcast player (e.g. Game Caller, MP# Player or CD Players with amplified speakers attached) should emit a sound pressure of 80-90 dB at 1 m in front of the speaker.

Safety awareness is even more important in the dark. Always use your hazard lights when your vehicle is stopped and never stop in a blind section of the road where traffic cannot see you well in advance, most notably curves and hills. Give traffic plenty of room for other drivers to detect you. We recommend you wear reflective and/or high-visibility clothing and avoid dark clothing. Be sure to let someone know where you are going and when you will be returning, and, if possible, travel with a partner.

Owls & Nightjars

May and June are the best months to listen for rails and nightjars, will be most active on nights with a visible, at least half-full moon. Nighthawks do not begin nesting until June, but their territorial diving display is performed in the evening before it truly gets dark. More detailed nightjar survey techniques can be found at nightjars.org.

Eastern Screech Owls begin nesting late February while Great Horned and Barred Owls are already calling in mid-winter. Great Horned owl territories are established and maintained through hooting, with highest activity before egg-laying and second peak in autumn when juveniles disperse. The best way to find Barn Owls is often to talk to landowners with barns on their properties; they will likely know if a Barn Owl is nesting there. Also, you can wait around coastal marshes, or other extensive grassy areas, around dusk, and hope to see them flying around. They can sometimes be seen at night flying over such areas, with the assistance of car headlights.

Call playback is encouraged for nocturnal atlasing of owls, rails, and bitterns, but not for regular atlasing. When employing playback to detect owls, always play calls in the sequence of smallest species to largest species with five-minute intervals between species. For example, play screech owl, then barred, then Great Horned Owl. Since larger owls will prey on smaller owls, this method increases detection rates of smaller owls. If a smaller owl responds, move to another location to avoid attracting larger owls. Finally, remember that playback is disruptive to a bird's behavior. Avoid prolonged bouts of playback—no more than two minutes of playback per species at each stop.

Black Rail

Peak Black Rail activity occurs during the courtship and egg-laying period in spring and early summer (i.e. late April, May and June). Black Rails are typically most vocal in the 2-3 hours surrounding sunrise and sunset. Surveys should only be conducted when wind speed is <12 mph (e.g. moderate breeze; dust and loose paper raised; small branches begin to move), and not during periods of sustained rain or heavy fog. Even winds <12 mph affect the detection of Black Rail, and perhaps even suppresses their calling behavior.

Call-response surveys including passive listening periods and playback of Black Rail vocalizations can be used to detect Black Rails. A 10-12-minute recording should be used. The first two minutes will be passive, followed by ten minutes alternating various Black Rail vocalizations (e.g. three "ki-ki-doo" dialects, churt calls, and growls). Possible sources for Black rail vocalizations are: Black Rail "ki-ki-doos" and "growl"- Stokes Field Guide to Bird Songs Eastern region and Macaulay Library.

Marshbirds

Peak marshbird calling activity occurs during the courtship and egg-laying period in spring and early summer (i.e. late April, May, early June). Marshbirds are typically most vocal in the 2 hours surrounding sunrise and sunset. Surveys should only be conducted when wind speed is <12 mph and not during periods of sustained rain or heavy fog. Even winds < 12 mph can affect the detection of marsh birds.

Because many marsh birds are secretive, seldom observed and vocalize infrequently, use of broadcast calls to elicit vocalizations can be effective in detecting marshbirds. Call-response surveys including passive listening periods and playback of various marshbird vocalizations can be used to detect various marshbird species. A 10-12 minute recording should be used. The first two minutes will be passive, followed by ten minutes of various marshbird vocalizations (e.g. Virginia Rail, King Rail, Clapper Rail, Sora, Common Moorhen, Least Bittern and American Bittern).

Appendix D: Field Guide - COMING SOON

- 2-pages
- Breeding Codes
- Survey Rules
 - Stay within block
 - Routes < 1mile or stationary