Handbook for the Massachusetts Breeding Bird Atlas 2

Methods, Strategies and References

Updated April 2008

Contact Information

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Mass Audubon

Breeding Bird Atlas 2

Conservation Science and Ecological Management

208 South Great Road

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Mass Audubon

Protecting the Nature of Massachusetts

Cover Illustration by John Sill

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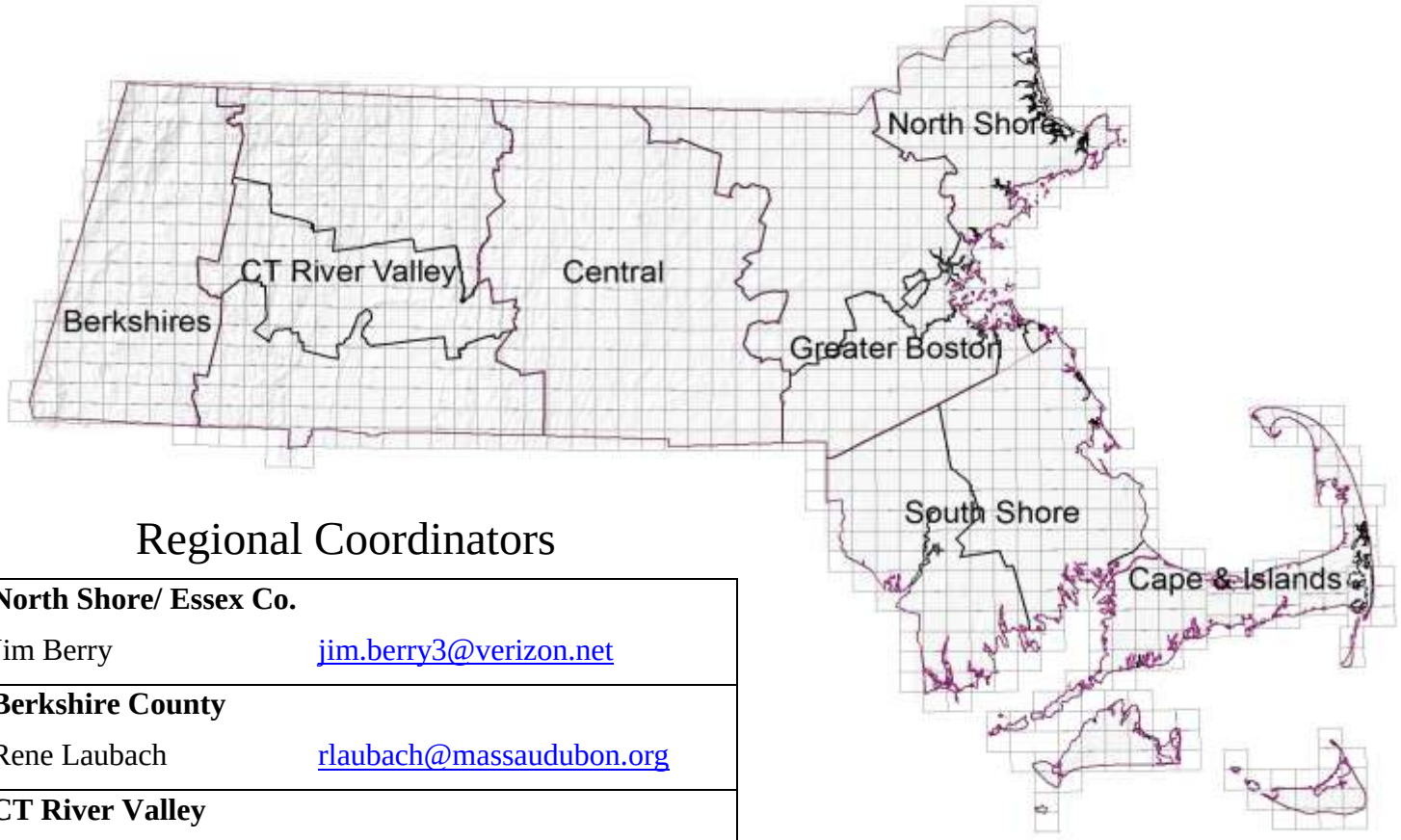
Massachusetts Breeding Bird Atlas 2
Regional Coordinators and Homepage

Fieldwork for the Massachusetts Breeding Bird Atlas 2 (BBA 2) is divided into the 7 regions outlined in maroon in the map below. The Coordinators, along with their email addresses, are also listed. Most of our communications are electronic, and our homepage has links to all needed materials.



Regional Coordinators

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Mass BBA 2 Homepage

Mass BBA 2 Homepage
www.massaudubon.org/birdatlas/bba2/methods/

Mass BBA 2 Email
birdatlas@massaudubon.org

Mass BBA 2 Snail Mail
Mass Audubon
Breeding Bird Atlas 2
208 South Great Road
Lincoln, MA 01773

Quick Start Directions

This handbook is long, and for many people, time is short. Here is a set of Quick Start directions to streamline the process.

- Our email address is birdatlas@massaudubon.org
- Read this Handbook, and set your BBA 2 homepage to:

  www.massaudubon.org/birdatlas/bba2/methods/
- Sign up to volunteer at:

  www.massaudubon.org/birdatlas/bba2/how_to_help.php
- Your Regional Coordinator will contact you, assign you to a block, and give you a data entry **Observer Code**. Get a copy of the Block Map at the same place you data entry site:

  www.pwrc.usgs.gov/bba/index.cfm?fa=explore.ProjectHome&BBA_ID=MA2007
- Download checklists and breeding codes at the BBA 2 home page.
- Study the block map and plan a strategy for visiting all habitats in the block in 20 hours. Don't trespass.
- Go birding in the block. Keep track of the time of the visits, and record the species found.
- Stay safe. Follow driving, boating, and biking laws, let people know where you are going, and carry a charged cell phone.
- Enter your data after each field trip.
- Switch cards from a Primary to a Supporting card after 20 hours of atlasing in a block.
- Make maps of the location of all State Listed species.
- After you last field trip and data entry, hit the **Finalize** button at the end of the data entry checklist so we know you are done.
- Mail checklists and maps to:

Mass Audubon
Breeding Bird Atlas 2
208 South Great Road
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Introduction to Breeding Bird Atlas 2

In 1979 Massachusetts' birders finished the first statewide North American Breeding Bird Atlas. This large-scale project was a five-year search for all breeding bird species in the Commonwealth and the results included distribution maps and species accounts of all breeding species in the state (www.massaudubon.org/birdatlas).

Atlas 1 followed methods used in the groundbreaking 1968-72 *Atlas of Breeding Birds in Britain and Ireland*. Soon after the Massachusetts Atlas 1 began, many other states and counties followed suit. Since 1979, first, second, and, in one case, third, breeding bird atlas projects have been launched around the world. Atlases are designed to be repeated and to make comparisons between surveys to evaluate changes in breeding bird distribution. In April 2007 birders from around Massachusetts began a second Breeding Bird Atlas, BBA 2, to gather the information needed to understand the scope and scale of the changes in breeding bird distribution around the Commonwealth.

Changes in breeding bird distribution are often the result of land-use changes. Since 1979 there have been profound changes in the landscape of Massachusetts. Some of these changes occurred quickly, some slowly, but when taken together the changes are substantial. Consider the following statistics from Mass Audubon's study "Losing Ground" (www.massaudubon.org/advocacy).

- Massachusetts lost 40 acres per day to "visible" development between 1985 and 1999.
- Twenty-four percent of the state's land area was developed as of 1999, compared to 17% in 1971.
- Between 2000 and 2002 residential and commercial construction continued to consume forest and agricultural land. We estimate that an additional 40,000 acres were affected by both visible and hidden development during that period
- Forest loss to development was particularly pronounced on Cape Cod and in southeastern Massachusetts.
- Loss of agricultural land to development was most pronounced through the I-495 corridor and Connecticut River valley.

These and other landscape-level changes drive changes in our wildlife communities—including our breeding birds. To understand the relationship between landscape alteration and changes in our breeding bird communities we need to measure the range and abundance of our breeding birds, and compare that information to historic information. The Breeding Bird Atlas is one of the best tools we have to measure the differences in bird distribution over time.

In any year in Massachusetts there are about 200 species of breeding birds, and the range and abundance of each of those species has changed since 1979. With decreasing farmland acreage, and old fields reverting to young forests, we have seen declines in species that rely on those early successional habitats, such as Brown Thrashers and Eastern Towhee. As forests have matured, we have seen mature woodland breeders like Pileated Woodpeckers and Cooper's Hawks increase. If we are to protect all of the birds in the Commonwealth we need current data of bird distribution, and we can gather those data by repeating the Breeding Bird Atlas.

The actions we take after measuring those changes can help us to restore our rich breeding bird communities, communities that add significantly to our quality of life. The Atlas is for you, it will be done by you; the Atlas is also for the birds, for the future, and for the all the fascinating and interlocking pieces of the puzzle that make up the Nature of Massachusetts.

Blueprint for Atlas 2

Atlas methods are well established by of the North American Ornithological Atlas Committee, and need to be followed as closely as possible. This will assure compatibility between the data from Atlas 1 and Atlas 2, and will make the comparisons between the two Massachusetts projects more meaningful. The goal of Atlas 2 is to measure the current distribution of breeding birds in the state, to those data to Atlas 1, and to that information to help set conservation priorities. In order to meet those goals we need consistency in the details of the data collection.

The steps to successfully completing an atlas are:

- Develop methods and materials for atlasing breeding birds.
- Divide the state into small atlas "blocks".
- Assign volunteers to blocks and distribute materials.
- Manage volunteer field surveys and data entry.
- Compile, proof and edit data each year.
- Analyze differences between Atlas 1 and Atlas 2 data.
- Report changes in bird distribution.
- Inform managers of current status and trends of Massachusetts' breeding birds, including all common, rare, Threatened and Endangered Species.

While each of these steps has multiple stages, ultimately the project's success depends on sound design and the reliability and accuracy of the field volunteers. The purpose of this manual is to assist the volunteers in understanding the logic behind the project design, the field and data entry methods, and to provide some strategies for successfully completing Atlas 2 blocks. Please read the entire handbook prior to signing up for a block, and don't hesitate to contact us if you have questions.

Blocks

Atlas 2 will use volunteers to map the distribution of all the species that breed in the state between 2007 and 2011. The state will be divided into 1056, 10 mi^2 blocks (Figure 1), and volunteers will be assigned to survey each block for a minimum of 20 hours. All breeding birds encountered during the survey are scored as Possible, Probable or Confirmed breeders. During the initial 20-hour surveys the goal is to maximize the number of Possible or Probable breeding species. Surveys beyond the initial 20 hours are used to increase confidence that species are breeding in a block, or to add new species to the block list.

What Is A Block?

Atlas blocks in Massachusetts were created by dividing USGS 7 ½ minute quadrangle maps (often called "topo" maps) into 6, 10 mi^2, blocks, and giving each block a unique name (Figure 2).

Since Atlas 1 many of the topo maps have been revised. Many are now wider, east-to-west, than the original maps. On those new maps the topo is broken into 12, 10 mi^2, blocks. In most areas of the state the new map revisions did not cause any changes to the block borders – but block names have changed.

Atlas 2 also added approximately 80 "border" blocks that were not surveyed in Atlas 1. Most of these blocks have land that falls outside of the state, and during Atlas 2 only Massachusetts land will be surveyed in those "border blocks". The remapping of the Gloucester and Rockport regions caused another difference between Atlas 1 and Atlas 2 blocks. Since Atlas 1 these topo maps were completely reconfigured, creating entirely new block boundaries in those areas.

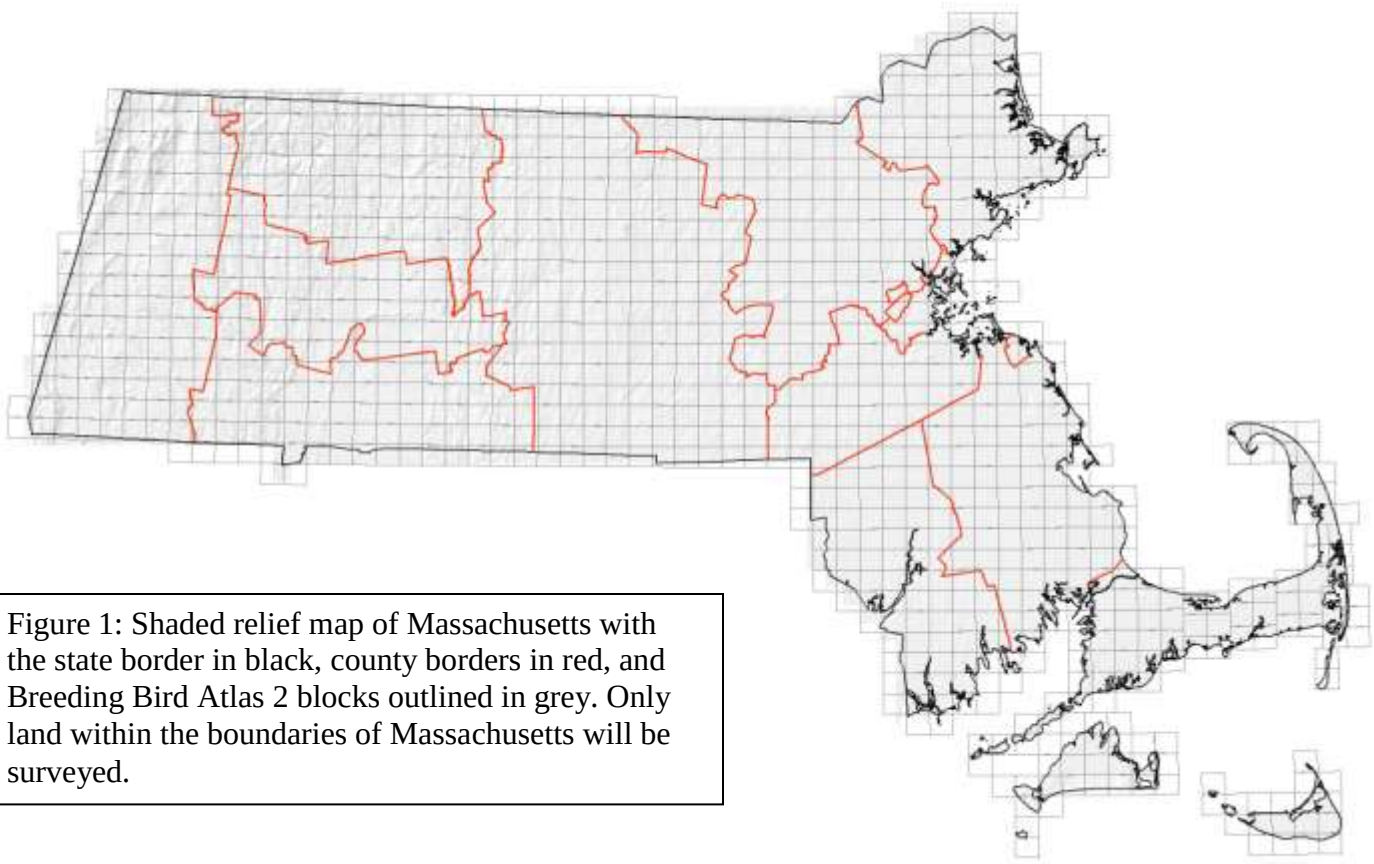

Figure 1: Shaded relief map of Massachusetts with the state border in black, county borders in red, and Breeding Bird Atlas 2 blocks outlined in grey. Only land within the boundaries of Massachusetts will be surveyed.

Naming a Block

Blocks are named by using the name of the most recent parent topo map, followed by a numeric designation for their position on the topo (Figure 2). Atlas 1 was completed in 1979, and since then the USGS has changed many of these topo maps to 7 ½ X 15 minute maps. This means that two of the original topos were joined, always west-to-east, to produce a "double-wide" map. One consequence of creating the new double-wide topos is that the names of the many parent topos have changed, which necessitates a change in the name of the block. This gave most blocks different names from Atlas 1, but in all but a few cases (Rockport and Gloucester topos outstanding) the borders of the blocks are the same longitude and latitude as Atlas 1.

Blocks also have a numeric code which is used to "crosswalk" the block data between Atlas 1 and Atlas 2. With the exception of new border blocks, or the Rockport/Gloucester remapping, blocks have the same numeric code for both Atlas 1 and Atlas 2.

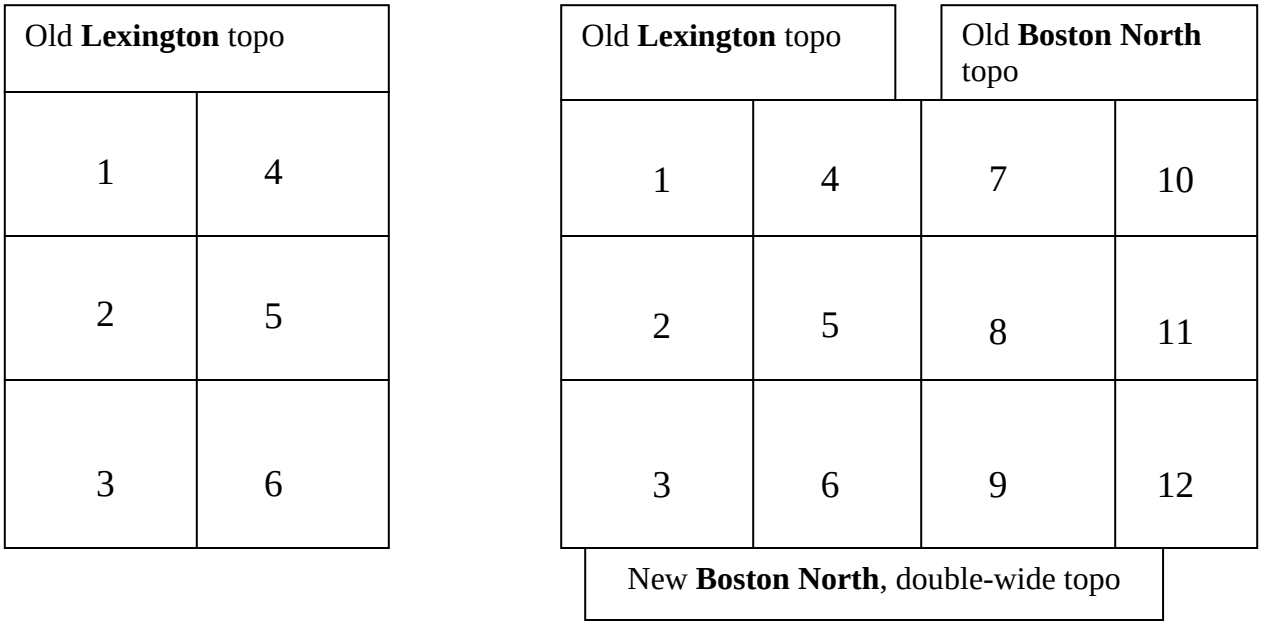

Figure 2: The map on the left is a model of a 7 ½ X 7 ½ minute USGS topo map for the old Lexington quadrangle. Blocks are named by the parent topo name being joined to number representing the placement of the block on the map. The block in the upper left would be Lexington – 1. Its numeric code is 681.

The map on the left has since been joined with the old Boston North 7 ½ X 7 ½ minute topo, creating the new, "double-wide" 7 ½ X 15 minute Boston North topo. The block designated old Lexington - 1 is now Boston North – 1, and the old Boston North - 1 is now Boston North – 7, but its numeric code is still 681.

How Do I Get Assigned To A Block?

After you have read this handbook you need to submit a Volunteer Sign-up form. That gets forwarded to your Regional Coordinator and he/she will assign you to a block to a block as a Primary or Supporting Atlaser. The Sign-up Form is found at:

- http://www.massaudubon.org/birdatlas/bba2/how_to_help.php

Once you are assigned to a block you can get a map of the topographic features and borders of the block from the *Block Maps* button on the USGS site:

- http://www.pwrc.usgs.gov/bba/index.cfm?fa=explore.ProjectHome&BBA_ID=MA2007

While surveying your block your first goal is to find as many breeding species as you can. Your second goal is to collect the highest level of breeding evidence for each species (see Appendix 1).

Safe Dates, Habitat and Behavior Codes

How Do I Know If I Found A Breeding Bird?

You can tell if a bird is breeding by looking for the species during the dates of its breeding season, in its breeding habitat, and watching it carefully. We have a set of Safe Dates for you to use to bracket your observations (Appendix 2). The Safe Date is the period when most migrants will have left, and when our breeding codes for Possible or Probable are most accurate. Additionally, we have a list of behaviors to look for to increase the confidence that birds found in your blocks are actually breeding (Appendix 1). When you join the Safe Dates and the Breeding Codes with breeding habitat (Appendix 2) you have narrowed down the likelihood of finding a breeding bird.

Many, but not all, birds that you see from June 1 – July 15 are breeding adults or recently fledged young. You can separate the active breeders from the non-breeders by carefully watching, recording the actions of the birds, and comparing the behaviors you observe to those listed in the Breeding Codes. The categories of breeding evidence are Observed, Possible, Probable and Confirmed. Observed, Possible and most of the Probable codes rely on the observation being collected during Safe Dates (Appendix 2) – the period when most migrants have passed, and the birds remaining are likely breeders. The strongest set of evidence, Confirmed, and one of the Probable codes (Courtship) can be collected at any time. It is very important that you know the breeding codes well.

Some species may expand their range into the state soon (e.g. Merlin, Ring-billed Gull), or are exceptionally rare or declining birds, (e.g. Short-eared Owl, American Kestrel). Any evidence of breeding for these species is very exciting, and important. For these species we ask for additional evidence of breeding (see *Reporting Rare Breeders* below).

How Do I Know If I Found a Non-breeding Bird?

The best way to separate the breeders from the non-breeders is to use the Safe Dates and Habitat list, and to carefully watch the birds for evidence of breeding.

There are many reasons a bird may be present in the breeding season, range and habitat, but not be a breeding bird. Some birds in your block may be too young to breed, they may not have attracted a mate, or they may have attempted to breed nearby but lost their nest. Some other types of non-breeding summer visitors are late or early migrants or summering non-breeders (e.g. beware of the lingering warblers out of habitat, and beware of some summering ducks that don't breed in the state, beware of "loafing" Double-crested Cormorants and coastal Common Loons). We want to collect data only on individuals that fit our criteria of Possible, Probable or Confirmed breeding.

There are other species that are found in Massachusetts during the northern hemisphere's summer, but they don't breed in the state - or even in the hemisphere (e.g. shearwaters and other pelagic birds). These species are not on the field checklist.

Recording Nesting Records: Exceptions for State Listed Species and Early/Late Nest Records

During the Atlas it is important to remember that a species needs to be Confirmed as breeding only once in any block during the 5 years of the project. The exceptions to this rule are State Listed species, and extra Confirmations in a block that record early or late nesting dates.

For State Listed species please map and report all locations for the birds you see in your block each year. For example, if you have American Bittern nesting in your block in 2007 – 2009 you would report it all three years.

For common birds however, once you find the first Confirmed American Robin, you don't need to collect any more data on robins for the rest of the surveys in that block. See the section below regarding *Reporting Rare Species*.

We also ask that if you find birds courting (the "C" code of Probable) or nesting (any of the Confirmed codes) outside of the Safe Dates that you report those sightings too. This will give us a more accurate estimation of the true nesting season for each species. See the section below regarding *Nest Phenology*.

When and For How Long Do I Survey?

- Time of Year: Blocks can be surveyed during any month when birds are breeding. The peak of breeding bird activity and diversity is typically from May 15 –August 1. After July 10 it becomes increasingly difficult to separate recently fledged young from adults, and fledged young may wander. Some species (e.g. Great Horned Owl) breed well before May 15, and some species (e.g. American Goldfinch and Cedar Waxwing) can nest as late as August. Block surveys should include early and late seasons as well the peak of breeding activity.
- Safe Dates: To collect data on breeders, not migrants, we have assigned a Safe Date for each breeding species. The Safe Date is the period when most migrants will have left, and when our breeding codes for Possible or Probable are most accurate. The Confirmed code, and the "C" code from Probable are is the only codes that can be used before or after the Safe Date. The list of breeding species and their Safe Dates and preferred breeding habitats can be found in Appendix 2.
- Time of Day: You can survey anytime, but birds are most active early in the morning and from late in the afternoon to the early evening. On cooler days, the period of morning activity may be lengthened, and on warmer days it may be shortened. Try to avoid very windy days, and rainy days.
- How Long:
    - Primary Atlasers cover a block for 20 hours. Hours traveling to and from a block, hours owling, and hours not devoted specifically to atlasing do not count as toward the 20-hour threshold.
    - Supporting Atlasers work in a block after the initial 20-hour period, or work concurrent to the Primary Atlaser, but do not share information with him/her. (See the section *Primary and Supporting Atlasers* below). Their time is not limited.
    - The amount of time needed to completely survey a block depends on topography, habitat complexity and diversity, accessibility of habitats, and to some extent, the skill level of the volunteer. The rate of new species additions declines after 10-15 hours, and the rate of upgrades declines after 30 total hours. Most blocks can be called "finished" after 30 hours – but atlasers can spend as much time as they want to in a block.
    - If you work in pairs and you are together in the field, count each hour as one hour. If two people split-up during surveys, they count the hours as two hours.
- Where: Cover as many different habitats as possible. Study your maps and take a reconnaissance trip prior to beginning Atlas fieldwork. Map out a strategy for visiting the fields, forests, wetlands, ponds, streams, hilltops, urban areas, and beaches. **Think about using a bicycle to efficiently cover ground**; on a bike you'll have almost no "down-time" due to car travel between stops in your block.

The Breeding Codes

Atlas breeding codes represent increasingly stronger evidence from Observed (not breeding) to Confirmed (definitely) breeding (Appendix 1). These codes are very similar to those used in other projects around the world, and those used in Atlas 1. When the breeding codes are combined with the Safe Dates and habitat information, the data collected excludes most non-breeding birds, and gives us a good estimation of the

seasonality of breeding in the Commonwealth. A brief summary of the codes is listed here, but more information is included in Appendix 1.

The most successful strategy is to actually watch birds. Birds give lots of signals that they are breeding. They sing, display, and drum to attract mates and declare territory. Once paired, birds rarely tolerate individuals of the same species other than their mate, during the breeding season. Territory battles, predator warning calls, and vocal displays are all part of maintaining breeding territory. These are just a few of the behaviors that are evidence of breeding.

An easy way to either spot a breeding bird or upgrade a species is to **watch what the birds are carrying**. Most species (crows and gulls excluded!) rarely carry anything in their bills in flight. But most breeding birds carry almost all of their nest material and food for their young in their bills (hawks usually use their feet to tote their nest material and food). During the earliest part of the season many confirmations are made with the *NB* (nest building) code – during the latter half of the breeding season, many confirmations are made with the *CF* (carrying food) or *FY* (feeding young) codes.

Upgrading the evidence to a higher code is important, and many Atlasers find this is their favorite part of the job. Collecting this information will provide some memorable moments and enhance your understanding of bird behavior. Keep in mind that it is more important to find a larger number of *Probable* breeders than to locate and only a few *Confirmed* species. If time allows, you can work on upgrading species to *Confirmed* later in the season.

You should also upgrade within a category if you can, although this is less significant. The codes within each category of breeding evidence are listed in order of the strength of the evidence. So while an upgrade within the *Probable* category won't make a difference on the final maps, it does provide more information on the species' nesting chronology.

Please remember that eggs and nests are protected, and can't be collected or disturbed. It is very important that we do not disrupt or disturb breeding birds during our surveys—don't play tapes and don't approach nests or young. You can collect all the information you need by watching the birds.

The Breeding Codes Deconstructed

Observed

Only use during Safe Dates for species known to breed in Massachusetts, but only seen "passing through" your block. For example you would use this for vultures seen in transit, late migrants out of habitat, or colonial nesting birds without a colony found in the block.

Possible

Only use during Safe Dates for a male or female seen or heard in suitable nesting habitat but with no further evidence of breeding. The Possible code is usually upgraded quickly if the bird is breeding nearby, and if you have a chance to watch for a few minutes.

Probable

With the exception of the "C" code, only use during Safe Dates. There are many codes in this category, and, excepting the "S" code, they all require that you watch the birds.

P A pair (male and female together) seen in suitable nesting habitat.

- **S** Permanent territory presumed through song (or drumming), heard at same location on at least two occasions, 7 days (or more) apart.
- **T** Permanent territory presumed through defense of territory. Most birds will not tolerate a bird another bird of the same species, other than their mate or young, near them while nesting. Birds are quite aggressive when breeding, and some territory squabbles are intense.
- **A** Agitated behavior or anxiety calls from adult.
- ***C*** Courtship and/or reproductive behavior seen. *(New: OK to use out of Safe Dates, but not for ducks)*
- **N** Visiting probable nest site (e.g. the tops of trees, chimneys).
- **B** Building a nest by a wren, or excavation of holes by single woodpeckers.

Confirmed: (can be used outside of Safe Dates)

- ON Occupied nest: adult seen sitting on nest and likely incubating eggs or brooding hatchlings.
- **CN** Carrying nesting material, such as hair, sticks, grass, bark, etc.
- **NB** Nest building at the actual nest-site.
- **PE** Physiologic evidence of breeding (e.g. brood patch or egg in oviduct.). To be used by bird banders.
- **DD** Distraction display or injury feigning.
- **UN** Used nest or eggshells found.
- **PY** Precocial (downy, capable of walking – think duck hatchling) young.
- **FL** Recently fledged young (either precocial or altricial) incapable of sustained flight.
- **CF** Carrying food: adult carrying food for the young.
- **FY** Adult feeding recently fledged young.
- **FS** Adult carrying fecal sac.
- **NE** Nest with egg(s).
- **NY** Nest with young seen or heard.

Primary and Supporting Atlasers

For the Massachusetts Breeding Bird Atlas 2 we have created two types of Atlasers - Primary and Supporting Atlasers. Primary Atlasers survey their block for 20 hours, attempt to visit all habitats in the block, and work to get a high breeding species total in that time. Supporting Atlasers survey their block for an unlimited amount of time, and work for both a high species count and to upgrade each species to the highest code. The people who worked in Atlas 1 worked exclusively with a Supporting Atlaser strategy. During Atlas 2 each block can have both types of Atlaser, and in the end of the project we will combine the data from multiple observers to make the distribution maps.

The reason we created these two types of atlasers is two-fold. First, we want to understand if the recorded differences between two blocks reflect true variability in bird distribution, or differences in sample effort, habitat, observer skill, or other factors. We are hoping to control for one of those variables – sample effort – by leveling the playing field between the blocks and having one data set with fixed effort to use to compare block totals. Primary Atlasers work to census blocks rapidly – spending 20 hours searching for all breeding species in the block. Supporting Atlasers are not limited by time, and look for all species in the block, and work to upgrade their breeding codes too.

The second reason we created the Primary Atlaser is to use that strategy for future census projects. The scale of atlas projects is large – in terms of both space and time. We want to create a data set that can be repeated more rapidly, and used in subsequent years for monitoring a sub-set of the blocks in the Commonwealth.

Many people wear both in their blocks. They switch between cards depending on the type of day they have planned – when they are still adding new species and visiting new habitats they are using their Priamry Card. When they are out for a casual day of Atlasing looking for upgrades, they are acting as Supporting. This is a very complicated strategy, and one we did not anticipate would actually be adopted by many observers. If you wear both Primary and Supporting Atlaser "hats" in your block, decide which Atlaser you are before you leave the house.

We recommend that you complete your 20 hours as a Primary Atlaser as soon as possible, rather than switching "hats" frequently. Early season observations and owling hours are an exclusion to this recommendation – but in general, try not to switch roles between Primary and Supporting too often.

Primary Atlasers

Primary Atlasers collect data during 20 hours of focused Atlas surveys in a block. They should approach blocks with "Big Day" strategy in mind. This strategy should be to visit each habitat in the block and find the maximum number of breeding species in the 20 hours of survey time. The 20 hours will be spent over several visits to the block, but most of these visits should be after May 15.

Primary Atlasers must keep a good record of the dates and times they are in the field. They need to know when they have put in 20 hours so they can switch to a new Supporting Atlaser card if they want to continue in the same block. Once they do switch to the Supporting Atlaser role, they do not need to refind birds on their Primary card – only new species and upgrades need to be recorded.

Primary Atlasers Devote Trips to Atlasing

These Primary Atlaser trips should be dedicated to atlasing. For most people it is not difficult to know when they are atlasing, but if you, as Primary Atlaser, live in the block, it can get tricky.

- Repeated visits to the same spot that is no longer yielding new species (like your favorite dog walking route) is not acting as a Primary Atlaser – although if you have binoculars and are looking for upgrades, it does count toward your Supporting Atlaser hours and sightings.
- If you encounter species in a block and you are not actively atlasing, you can record those species on a Supporting Atlaser card. If you can it is OK to re-find them on a future Primary Atlaser trip if you can (this question has been asked a lot).

Primary Atlasers Focus on New Species, and Possible and Probable, in Safe Dates

Primary Atlasers have limited time. In general, it takes more time to Confirm species than to find birds in the Possible or Probable categories. It is likely that, due to the 20 hour time limit, many of the species recorded by the Primary will be in the Possible or Probable categories. Probable is a much stronger category of breeding evidence than Possible, and that upgrade should be part of the focus of the Primary Atlasers trips. Since the Primary Atlasers will usually be using the Possible and Probable categories, most of their 20 hours should be used during Safe Dates – not before or after Safe Dates.

Apportioning Your Time

We recommend that a Primary should spend no more than 5 hours of active Atlasing in their block prior to May 15, and they may choose to spend all of their 20 hours after May 15. If they do encounter breeding birds prior to the beginning of their Primary surveys, they can and should record them on their Supporting Atlaser card.

The data from the Primary Atlaser will exclude hours specifically devoted to night birding (put those data on your Supporting Atlaser card), and hours spent on special surveys (we will begin point counts and marshbird surveys in year 3). Night birds found on typical Atlas visits should be counted, however.

Using Teams to Complete the Primary 20 Hours

The 20-hour data can be collected by teams, and we encourage people to do so. A team of 4 people can choose to divide a block into 4 areas and then each spend 5 hours atlasing those areas. At the end of the sample (which can be completed in one morning) they can combine their sightings onto one Primary Card, and the 20 hours will be completed for that block. There is no limit to the size of the team, as long as all the habitats in the block are sampled, and the observers keep track of their time. Any birds found in the block after the completion of the 20 hours should be included on a Supporting Atlaser card.

Supporting Atlasers

Supporting Atlasers come in two "breeds" – those who are also the Primary Atlaser, and those who are not. If the Supporting Atlaser was also the Primary Atlaser in the block they will be able to revisit birds they found on their initial surveys and upgrade those species to higher breeding codes, or they may even be able to add new species. Primary Atlasers that live, work, or otherwise visit a block frequently will also act as Supporting Atlasers when they find birds on incidental trips through the block when they are not actively Atlasing.

Supporting Atlasers Focus on Habitats and Upgrades

Supporting Atlaser's task is to visit different habitats in the block, and get highest number of species at the highest code with no time limit. Unlike the Primary, the Supporting Atlaser focuses on upgrading species as well as finding new species. There is no time limit on the Supporting Atlaser's work, and there will be instances when the Supporting Atlaser will spend more time in a block than the Primary Atlaser.

We will have more blocks to cover than we will have atlasers. We encourage you to become a Primary Atlaser in at least one block, rather than working as a Supporting Atlaser only.

Calculating Hours

This should be easy enough – mark you start and end time while atlasing in a block, and enter that on the checklist and data entry site. The data entry site used decimal hours (e.g. 1:30 = 1.5 hours). Hours are counted in the same way Christmas Bird Counts count Party Hours – singles or groups working together count as single hours. Teams that have separated each count their hours individually.

Sometimes Atlasers have a hard time knowing how to count hours, and when they are acting as Primary or Supporting Atlaser. **As a general rule, if you encounter a bird and have to ask yourself if you were atlasing or not, then, no, you were not atlasing.** The bird should go on your Supporting Atlaser field card, or be entered as an Incidental Sighting if you are not assigned to that block. You can consider that you worked 0 hours on that sighting.

Some other examples of tricky time accounting are presented in Appendix 4.

Recording Nest Phenology

We would like to have an accurate record of the dates of courtship and nest initiation. Atlasers are encouraged to record early or late nest records, and early courtship displays using the USGS data entry site. Any courtship or nest records, especially those out of Safe Dates, should be recorded. Use the USGS data entry site to record these data. Log the data as an Incidental, and use the select "P" for the type of incidental. You can enter multiple species and codes for the same block using this tool. The data entry site maintains a record of all data entered – even if the same code is entered for the same species on multiple days.

Data Management

How Do I Keep Track Of My Data In The Field?

The paper-less office was a great idea, but it turns out that paper trails are an indispensable component of research projects. Please don't rely on your memory while you are in the field—write everything down, or record it in your PDA/Pocket PC.

Before you go into the field download a copy of the checklist at the BBA 2 homepage. Be sure to fill in all the requested information on the front of the checklist, and please note dates and times of all ATLAS visits to your block. Identify the time and dates you spend owling or listening for night birds at night. For each species found, fill in the date and code of the breeding evidence found. If you upgrade a species simply put that in the same line of data with the new date. For species that go through multiple upgrades, you can record the intermediate codes and dates on the *Notes* section on the checklist. If you run out of space on a checklist, you can always start a second checklist—just be sure to mail both checklists to us after data entry. <u>It is important that the highest code is shown on the field checklist.</u>

If you use a paper notebook to record field notes, please fill out an Atlas 2 checklist for each block Please double-check your transcription from your notebook to the checklist to reduce errors. We <u>***strongly***</u> encourage everyone to fill out the checklist in the field, and enter the data shortly after you return from the field. If you use that strategy, and happen to lose a checklist along the way, you'll only lose one day's data. **Your data are only as safe as your most recent back up, and you can think of the online data entry as a backup.**

Even though we will have an electronic copy of your data, we need you to send us a paper copy of your checklists at the end of the breeding season. This seems redundant, but it will be the only way we can check for errors in data entry. We encourage you to make a copy of your checklists for your records prior to mailing. Our mailing address is:

Mass Audubon
Breeding Bird Atlas 2
208 South Great Road
Lincoln, MA 01773

You can also include any narrative you'd like when you return mail the checklists to us. Atlasers usually have tales to tell about their time in the field. Feel free to jot down your stories you collect while atlasing, and staple them to the checklist. We'll share some of them with other Atlasers.

How Do I Enter My Field Data into the Website?

We have partnered with USGS biologists to build a data entry tool for Atlas 2, and it can be found at http://www.pwrc.usgs.gov/bba/. Choose the option for Massachusetts 2007-2011 to enter our section of the web site, but be sure to explore the rest of the site another time. The data entry site will help you keep track of the blocks you are working on, the hours you have spent in the blocks, and the species you have reported. After you have entered your data the site will report any problems with the data codes or species entered, and will remind you of any rare species that require further documentation. You can find detailed directions for entering data in a .pdf file located at http://massaudubon.org/birdatlas/bba2/.

You will need to be a registered volunteer to enter data on this site, but summary information is available to anyone through the **Results** section of the web site. If you are not a registered atlaser, you can still enter data using the *Report A Breeding Bird* tool at the Atlas 2 web site http://www.massaudubon.org/birdatlas/bba2/methods/report_a_breeding_bird/sign_in.php

Reporting Rare Species

We need to have **exact point locations** for some species: State and Federally listed species, very rare or new breeders to the state, and species for which Mass Audubon has a special interest. You can find the list of those species in Appendix 2, and they are also in **bold face** on all field checklists. (*Note: At this writing – April 2008, we are preparing an online mapping and data recording tool for State Listed species. Registered atlasers will have access to the tool through the USGS data entry site, and will be notified when the tool is launched*.)

Some species will need to have independent confirmation of their identification. Email your Regional Coordinator if you find any of the species noted on the checklist as E, T, SC, L, or N.

Creating the point location is easy—just download or make a copy of your block map, put an "X" on the map where you found the species, include the date(s) and the behavior of the bird, and send it to us at the above address. If you see the rare species at multiple sites in the block, please report all locations – foraging locations, breeding spots, roosting sites. The state does require a Natural Heritage form to be filled out for each State Listed species (E, T, or SC on the checklist). Until we launch the online Rare Bird Mapping Tool we have a **Rare Species Report Form** available for download at the Mass Audubon Breeding Bird Atlas homepage. Fill out that form and include it with your map for all E, T and SC species.

Incidental Sightings

If you see a nesting bird, and you are not assigned to that block, you can still report that sighting as an Incidental Sighting. Registered Atlasers will find an Incident reporting tool on their "My Atlas View" page at the USGS data entry site. It is easy to figure out the block you were in by using the mapping tool to find the block name where you found the Incidental Sighting.

If you not a registered Atlas participant you can link to the to *Report A Breeding Bird* tool at the Atlas 2 web site http://www.massaudubon.org/birdatlas/bba2/methods/report_a_breeding_bird/sign_in.php.

Strategies for Atlasing

Teamwork

Working in pairs, or even in larger teams, is a great way to get the block done quickly, and to maximize your block totals. Two or more people working a block and reporting species to one another via cell phone can help you focus your work—and it makes the surveys more fun. For example, if you had four people working in different locations within a block, and you each spent from 6:30 AM to 11:30 AM you would have accomplished the threshold of 20 hours in the block. If the team can do that four times each season, they'll complete four blocks each year. Bigger teams mean more fun, and more blocks completed each year. There are about 1050 blocks to survey – if we can get 100 teams together, we can cover 800 blocks in two years; so Think Big!

Safety

Your safety is extremely important to us. Working in pairs or teams is encouraged. Please don't survey alone at night. Don't trespass on posted land. If your atlas work takes you out into remote areas or out in a boat, don't go alone. Be sensible: follow all biking, wilderness, and boating safety laws and standard precautions. Let people know where you are going and when you expect to return. Carry a charged cell phone.

Please remember, if a situation doesn't feel safe, it probably isn't safe.

If your Atlas surveys take you to any state or federally owned land that is posted as closed, please contact us to help you get permission to enter.

How Do I Choose Where to Look In My Block?

The first thing to remember is that when habitats change, breeding species often change. Your goal is to find as many breeding species as possible, and to do this effectively you must visit all the different habitats in your block. We encourage you to study many different maps of your block – use Google maps, the block topo maps, road atlases, and local maps of protected areas or open space. Each of these will give you a different perspective of the block, and will help you to plan your time.

If you know your area well, chances are you know how you'd progress through the area—just like doing a "Big Day" in the block. One of the most exciting things about the fieldwork is getting to know new areas and discovering new birding "patches." If you have a new block, and are unfamiliar with the area scouting your block in the off-season will give you a good idea of the access point to open space, and the distribution of different habitats in the block.

What Do I Look and Listen For?

It is important to bird with some expectations of what you may see and hear. We have included a list of references in Appendix 3 to help you "tune-up" for the field season. If you don't know the calls of common and rare species, use this chance to learn a few each day. The *Birding by Ear* series, by Richard Walton, is a great tool, and *The Birder's Handbook* by Ehrlich, Dobkin and Wheye is helpful for interpreting behavior. The online reference, *The Birds of North America*, is also a thorough digest of courtship and nesting behaviors. If you have never worked on an Atlas before you should know that the learning curve is steep. Your second block will be easier than your first, so try and do more than one block. You will be able to leverage what you learned in the first block while you work on the second.

It is also important to be conservative in your species ID-**if you are not sure what you saw, or are not certain of a species' ID, don't add it to your checklist.** If you think you found a rare bird, don't be shy; call in others to help you identify the bird. If the species in question is breeding, you should be able to find the birds again. Take photos of rare birds if you can.

Contact Information

This is a large project, and we contact our volunteers through e-newsletters and emails. It is likely that we will add additional levels of complexity during the life of the project. It is also possible that we will modify our checklists, data reporting forms, enhance the reference lists, or want to communicate the results of the surveys at the close of each season. To receive information about the changes in the project, be sure you have signed up, and please notify us if you change your email address.

Thank you for your sharing your expertise and time, and for helping us to collect this important information. If you have questions that can't be answered by your Regional Coordinator please don't hesitate to contact us at:

birdatlas@massaudubon.org
Mass Audubon
Breeding Bird Atlas 2
Conservation Science and Ecological Management
208 South Great Road
Lincoln, MA 01773

Appendix 1: Breeding codes

The Massachusetts Breeding Bird Atlas 2 will use the following codes for describing bird behavior. It is worthwhile to study the codes and know them well – this is what you are looking for in the field. Breeding birds are often short on time, and careful observation of an actively nesting bird will usually uncover one of these behaviors. Remember to try to upgrade a species' code, and pay attention to the Safe Dates.

OBSERVED: (all observations must be within Safe Dates)

O The Observed code is used during Safe Dates for species known to breed in Massachusetts, but only seen "passing through" your block. For example you would use this for vultures or gulls seen in transit through your block. You also use Observed when you find colonial species using the block (e.g. Great Blue Heron feeding) but you never find a colony in the block. You also use Observed when you find a late migrant or a bird in unsuitable nesting habitat (e.g. a Blackpoll Warbler in Cape Cod after Safe Dates begin). Only use this code when no further evidence of breeding is uncovered. Work to upgrade these species if you suspect they are breeding in the block!

POSSIBLE: (all observations must be within Safe Dates)

X Only use during Safe Dates. This is the code you will start with for most species. It simply means you have had a male or female seen or heard in suitable nesting habitat but that no further evidence of breeding was uncovered. This includes a drumming woodpeckers, although be sure you know the differences between drumming rates to ID the woodpecker. The Possible code is usually upgraded quickly if the bird is breeding nearby, and if you have a chance to watch for a few minutes.

PROBABLE: (all observations must be within Safe Dates, except "C" Code which can be used any time)

P A pair (male and female together) seen in suitable nesting habitat. For species where the male and female have identical plumage (e.g. Blue Jays) use this code after watching the birds. A pair will act like a mated pair – they will be tolerant, sometimes even attentive, to one another. Most birds will not tolerate a bird another bird of the same species, other than their mate, near them while nesting. Watch closely and they may reveal courtship (C) or nest building (NM).

S Permanent territory presumed through song, heard at same location on at least two occasions, 7 days (or more) apart. Record as "X/S" the first time you hear them, and upgrade to "S" on the second visit. This code can be used for drumming woodpeckers –ID the woodpecker by drumming carefully. Both observations must be within Safe Dates.

T Permanent territory presumed through defense of territory, often one male chasing another. Should not be used for disputes over food (e.g. hummingbirds at feeders). In general, birds are quite aggressive when breeding, and some territory squabbles can be intense.

A Agitated behavior or anxiety calls from adult. These calls are frequently directed at cats or snakes. Don't use this code if the bird is responding to human pishing. If the agitated call is directed at you, you may be too close to a nest and you should back off. Much like "T" code, use carefully and watch for better evidence.

C (**NEW: OK to use outside of the Safe Dates, except for ducks**) Courtship and/or reproductive behavior seen. Some species have courtship feeding rituals (e.g. cuckoos, Cedar Waxwing), and some

raptors have spectacular courtship displays (Cooper's, Broad-winged and Red-tailed Hawks, falcons). This is one of the best codes to use for hummingbirds. Consult *The Birder's Handbook* or *Birds of North America* for succinct display descriptions. An example of some common uses of this code prior to Safe Dates would be recording courting hawks and woodcock on singing grounds.

N Visiting probable nest site. Some nests are too high (e.g. the tops of trees) or enclosed (e.g. chimneys) for the contents to be seen. Listen for calls of begging young and watch for food deliveries to upgrade to Confirmed. If neither is seen or heard, the birds may still be on eggs – return a few days later if you can. **Do not approach nests to check contents!**

B Building a nest by a wren, or excavation of holes by woodpeckers. Wrens often build "dummy" nests – a series of nests of which none may be used for raising young. Don't despair - finding a wren nest means you are very close to a Confirmation. It is usually easy to Confirm wrens with CF. Woodpeckers will excavate roost holes as well as nest holes – but roost holes are usually excavated by one sex – nest holes usually worked on by the pair. Woodpeckers are often upgraded with CF or NY.

CONFIRMED: (can be used outside of Safe Dates)

ON Occupied nest: adult seen sitting on nest and likely incubating eggs or brooding hatchlings. No eggs or young seen. **Do not approach nests to check contents!**

CN Carrying nesting material, such as hair, sticks, grass, bark, etc. Don't use for wrens, crows, Monk Parakeet, or for colonial species for which you never find a colony (e.g. Great Blue Heron). OK for woodpeckers.

NB Nest building at the actual nest-site. Don't use for wrens - attempt to upgrade wrens with CF or by the noisy NY. Don't use for Monk Parakeet. **Do not approach nests to check contents!**

PE Physiologic evidence of breeding (e.g. highly vascularized brood patch or egg in oviduct, based on bird in hand.). To be used by bird banders.

DD Distraction display or injury feigning. Look for this in Killdeer and in <u>many</u> other species - other shorebirds, rails, some ducks, some warblers. If you are causing the display, please back away.

UN Used nest or eggshells found. Caution: these must be carefully identified if they are to be accepted.

PY Precocial young. Flightless precocial young, restricted to the natal area by dependence on adults or limited mobility. Precocial young are able to move about within hours of hatching - think "fuzzy", but walking – think young ducks or shorebirds. (This is the opposite of altricial young – think young American Robin – fairly helpless and restricted to the nest for many days before fledging. For nest-dependent altricial young use NY.)

FL Recently fledged young (either precocial or altricial) incapable of sustained flight, restricted to natal area by dependence on adults or limited mobility.

CF Carrying food: adult carrying food for the young. Don't use for hawks, crows, Common Raven, raptors, gulls or terns – hawks carry food all of the time, and crows conceal food on the way to the nest .

FY Adult feeding recently fledged young. An adult bird feeding Brown-headed Cowbird young confirms both the host species and the cowbird. Gulls and terns will feed fledged young for extended periods, often far from the breeding colony and should be excluded if they are no longer in a colony.

FS Adult carrying fecal sac. Fecal sacs, white membranous pellets excreted by the young, are usually carried from the nest then dropped. Occasionally birds drop them in the same place, and they form a spattered whitewash on cars, pavement, decks etc. Watching that "drop spot" for a few minutes may reveal a Confirmation. Sometimes they take them and "wash" them in pools (honest!).

NE Nest with egg(s). **Do not approach nests to check contents!** If you have the time to watch a bird through binoculars or with a scope, watch as the incubating bird turns the eggs in the nest. Many birds remove eggshells, and you'll find them on the ground sometimes - they can be difficult to identify! A nest containing Brown-headed Cowbird eggs confirms both the host species and the cowbird.

NY Nest with young seen or heard. A frequently used code - young are usually noisy when parents return with food. Learn the sounds of begging young birds, and let that direct you to the general area of the nest where you can identify the parents. These young are altricial young – think young American Robin – fairly helpless and restricted to the nest for many days or weeks after hatching. For those species where the young can walk soon after hatching (e.g. grouse, shorebirds, turkeys) use PY if you see young.

Appendix 2: Safe Dates and Preferred Habitats

This table summarizes the most frequently used breeding habitats for a species, and lists the Safe Date period. The Safe Date is the period when most migrants will have left, and those birds that remain are likely nesters. Safe dates are also the only period when you can use our breeding behavior codes for Observed, Possible or Probable. The Confirmed code, as the name implies, has less error, and can be used before or after the Safe Date.

All species in **bold face type** are rare breeders, and require maps and further documentation. See the handbook on Reporting Rare Species.

Species	Safe Dates	Habitat
Canada Goose	4/15-8/1	Shore or islands in any wetland
Mute Swan	4/15-8/1	Large ponds and marshes
Wood Duck	5/1-8/5	Wooded swamps, freshwater marshes, streams, rivers
Gadwall	5/15-8/5	Fresh/brackish water or saltmarsh
American Wigeon	5/15-8/5	Fresh/brackish pond or marsh
Am. Black Duck	5/1-8/5	Most wetlands, from beaver ponds to saltmarsh
Mallard	5/1-8/5	All wetlands, occasionally suburban yards with swimming pools
Blue-winged Teal	5/10-8/5	Fresh/brackish pond or marsh
North. Shoveler	5/15-8/5	Fresh/brackish pond or marsh
North. Pintail	5/15-8/5	Fresh/brackish pond or marsh
Green-winged Teal	5/15-8/5	Fresh/brackish pond or marsh
Ring-necked Duck	5/25-8/5	Wooded swamps, beaver ponds, stump ponds
Common Eider	5/15-8/1	Coastal islands
Hooded Merganser	5/15-8/5	Wooded swamps, freshwater marshes, streams
Common Merganser	5/10-8/5	Lake or river
Red-breasted Merganser	6/1-8/5	Coastal marsh
Ruddy Duck	5/15-8/1	Fresh/brackish pond or marsh
Ring-necked Pheasant	5/1-8/15	Open scrub, pastures, fields
Ruffed Grouse	1/1-12/31	Mixed upland woods
Wild Turkey	1/1-12/31	Mature deciduous woods, edge
North. Bobwhite	4/30-8/15	Open scrub, pastures, fields
Common Loon	6/1-8/1	Lakes and ponds
Pied-billed Grebe	5/10-8/1	Fresh/brackish reedy pond or marsh
Leach's Storm-Petrel	6/1-8/15	Coastal Islands
Double-cres. Cormorant	5/10-8/5	Islands on coast or lake

Great Cormorant	5/1-8/5	Islands on coast
American Bittern	5/15-8/1	Fresh/brackish reedy pond or marsh
Least Bittern	5/25-8/1	Fresh/brackish reedy pond or marsh
Great Blue Heron	5/1-7/15	Wooded swamps, beaver ponds, islands
Great Egret	5/15-7/15	Islands on coast or lake
Snowy Egret	5/15-7/15	Coastal Islands
Little Blue Heron	5/15-7/15	Coastal Islands
Tricolored Heron	5/25-7/15	Coastal Islands
Cattle Egret	5/10-7/15	Coastal Islands
Green Heron	5/10-8/1	Woody growth near marshes or open water
Black-crown. Night-Heron	5/5-7/15	Coastal Islands
Yellow-crown. Night-Heron	5/5-7/15	Coastal Islands
Glossy Ibis	5/1-7/15	Coastal Islands
Black Vulture	5/10-8/15	Woods, cliffs, caves, buildings
Turkey Vulture	5/10-8/15	Woods, cliffs, caves, buildings
Osprey	5/10-8/15	Coastal marshes; rarely large wetlands inland
Bald Eagle	4/15-8/15	Margins of large lakes, rivers
North. Harrier	5/10-8/20	Coastal dunes, beaches, marshes, heathlands
Sharp-shinned Hawk	5/10-8/1	Conifers in mature woodlands
Cooper's Hawk	5/5-8/1	Mixed woodlands, groves, copses
Northern Goshawk	4/10-8/15	Mature, mixed woodlands
Red-shouldered Hawk	4/10-8/15	Wet mixed forests, swamps
Broad-winged Hawk	5/15-7/25	Mature, mixed woodlands
Red-tailed Hawk	4/15-8/1	Mature woodlands, often near edges
American Kestrel	5/10-7/20	Open country, scattered trees, edge
Merlin	5/10-7/20	Conifers
Peregrine Falcon	5/15-8/1	Cliffs, tall buildings, towers
Clapper Rail	5/15-8/1	salt and brackish marsh
King Rail	5/15-8/1	Fresh/brackish reedy pond or marsh
Virginia Rail	5/15-8/1	Salt, fresh, or brackish pond or marsh
Sora	5/15-7/25	Fresh/brackish reedy pond or marsh
Com. Moorhen	5/25-8/15	Fresh/brackish reedy pond or marsh
American Coot	6/1-8/15	Fresh/brackish reedy pond or marsh
Sandhill Crane	5/1-8/1	Extensive, freshwater marsh or bog
Piping Plover	5/15-8/15	Coastal, sandy beach
Killdeer	4/20-7/1	Open, sparsely vegetated areas; flat rooftops

Am. Oystercatcher	5/15-8/15	Upper portions of coastal beach, dunes
Willet	5/15-7/15	Coastal beach, dunes, saltmarsh
Spotted Sandpiper	5/25-7/5	Coastal shores, shores of freshwater lakes, ponds, rivers, streams
Upland Sandpiper	5/20-7/15	Extensive grasslands, especially airports
Least Sandpiper	5/25-6/15	Variety of coastal habitats
Wilson's Snipe	5/20-8/1	Bog, wet meadow
Am. Woodcock	4/15-7/15	Forest edges
Wilson's Phalarope	6/1-7/25	Saltmarsh
Laughing Gull	5/1-8/1	Coastal islands
Ring-billed Gull	5/1-8/1	Lakes, reservoirs
Herring Gull	5/1-8/1	Coastal shores/islands, flat rooftops
Lesser Black-back. Gull	5/1-8/1	Coastal shores/islands
Greater Black-back. Gull	5/1-8/1	Coastal islands
Roseate Tern	6/1-8/5	Coastal islands
Common Tern	6/1-8/5	Coastal islands, saltmarsh
Arctic Tern	6/1-8/5	Coastal sandy beaches, islands
Forster's Tern	6/1-8/5	Saltmarsh
Least Tern	5/25-8/15	Coastal sandy beach, esp dredge spoils
Black Skimmer	6/1-8/1	Coastal, sandy beach
Black Guillemot	6/1-8/1	Coastal rock ledge
Rock Pigeon	1/1-12/31	Buildings, bridges, towers in urban areas, farms
Mourning Dove	4/1-8/15	Suburbs, woodlots, farmlands
Monk Parakeet	6/1-8/1	Urban streets, large trees, telephone poles
Black-billed Cuckoo	6/5/8/15	Forested habitats, edge
Yellow-billed Cuckoo	6/5-8/15	Forested habitats, edge
Barn Owl	4/1-8/1	Open habitats
Eastern Screech-Owl	4/1-8/1	Open deciduous forests, woodlots, orchards, residential areas
Great Horned Owl	1/1-12/31	Wide variety of habitats from forest to farmland
Barred Owl	4/1-7/15	Moist woods, wooded swamps, bottomlands.
Long-eared Owl	4/1-8/1	Conifers
Short-eared Owl	5/1-8/1	Extensive coastal grassland/heathland
North. Saw-whet Owl	4/15-8/15	Mixed moist woods with conifers
Com. Nighthawk	6/5-8/1	Barren habitats including river bars and flat rooftops
Chuck-will's-widow	6/1-7/15	Scrub Oak
Whip-poor-will	5/25-7/15	Secondary forest, copses, pine barrens, scrub oak, edge
Chimney Swift	5/25-8/15	Urban chimneys

Ruby-throated Hum.	6/1-8/1	Open woodland, rural and suburban gardens, edge
Belted Kingfisher	5/1-8/10	Stream, river, lake, or bay shore with banks
Red-headed Woodpecker	5/20-8/25	Open country with scattered trees
Red-bellied Woodpecker	4/15-8/1	Older-growth forest and woodlots
Yellow-bellied Sapsucker	5/20-8/1	higher-elevation hardwoods
Downy Woodpecker	5/1-7/25	Forests, copses, suburbs
Hairy Woodpecker	4/25-7/20	Forests
North. Flicker	5/25-7/25	Forests, parks,
Pileated Woodpecker	1/1-12/31	Matured forest, especially bottomland
Olive-sided Flycatcher	6/5-8/1	Spruce/Larch bog
Eastern Wood-Pewee	6/5-8/1	Mature forest
Yellow-bellied Flycatcher	6/5-8/1	Spruce/Sphagnum bog
Acadian Flycatcher	6/5-8/1	Red Maple swamp (SE) and Hemlock (elsewhere)
Alder Flycatcher	6/5-8/1	Shrub (esp. Alder) swamp
Willow Flycatcher	6/5-8/1	Shrub (esp. Willow) swamp
Least Flycatcher	5/25-8/5	Open deciduous forests, forest edge
Eastern Phoebe	5/1-8/15	Ledges, bridges, porch sills, etc., usually near water
Great Crested Flycatcher	5/25-8/1	Mature forest, edge
Eastern Kingbird	5/25-7/25	Open habitats, including edge, copses, often near water
Loggerhead Shrike	5/15-8/1	Farmland and other open habitats
White-eyed Vireo	5/15-8/1	Moist areas, thickets, tangle of vines or briers.
Yellow-throated Vireo	5/20-8/10	Open deciduous and mixed forest and riparian woodlands
Blue-headed Vireo	5/15-8/10	Mature coniferous or mixed woods
Warbling Vireo	5/15-8/10	Semi-open borders of river meadows, ponds, and streams
Red-eyed Vireo	6/1-8/10	Mixed and deciduous Woods
Blue Jay	5/1-8/15	Varied; most forest types, thickets, suburban yards, parks
American Crow	3/25-7/15	Conifers in forested areas, woodlots, suburban yards, parks
Fish Crow	5/1-7/15	Mixed woods, woodlots, suburban yards, parks
Common Raven	3/20-7/20	Remote forested areas
Horned Lark	4/25-8/1	Coastal dunes and beaches, abandoned agricultural fields, airports
Purple Martin	5/25-7/1	Open areas; edge of saltmarsh, coastal farmland, and golf courses
Tree Swallow	5/15-7/1	Open areas or woodland edge near wetlands; including saltmarsh
Northern Rough-winged Swallow	5/20-7/1	Often near water, in cavity, pipe, or excavated burrow
Bank Swallow	5/25-7/1	Earthen embankments
Cliff Swallow	5/25-7/1	Eves and sides of old barns and other buildings, bridges

Barn Swallow	5/25-7/1	Structures offering access to interior; barns, garages, porches, sheds, etc.
Black-capped Chickadee	4/1-8/15	Woodlands, orchards, shade trees, yards, and city parks
Tufted Titmouse	4/5-8/1	Deciduous (especially oak) forest, riparian woodlands, and residential areas
Red-breast. Nuthatch	5/15-8/10	Coniferous forest
White-breast. Nuthatch	4/25-8/10	Deciduous forest
Brown Creeper	5/20-8/1	Mature, mixed, and swampy forest, including Atlantic White Cedar swamps
Carolina Wren	4/1-8/15	Wet woods, stream edges with dense thickets, tangles, brush piles, etc.
House Wren	5/20-8/15	Open forests, wood edges, farms, orchards, suburbs, parks, gardens
Winter Wren	5/1-8/5	Cool, moist, coniferous or mixed woods, swamps, bogs, streams, brooks
Sedge Wren	6/1-8/1	Wet meadows, freshwater marshes
Marsh Wren	5/15-8/15	Cattail and other tall marshes, including saltmarsh edges
Golden-crowned Kinglet	5/10-8/1	Coniferous woods
Ruby-crowned Kinglet	5/20-8/1	Coniferous woods
Blue-gray Gnatcatcher	5/15-8/1	Wooded edges along ponds, rivers, streams, swamps, beaver ponds
Eastern Bluebird	5/1-8/15	Fields with scattered trees; farmland, orchards, pastures, etc.
Veery	5/25-8/10	Moist mixed forest
Bicknell's Thrush	6/1-8/10	High elevation spruce/fir forest
Swainson's Thrush	6/1-8/10	High elevation spruce/fir forest
Hermit Thrush	5/10-9/10	Damp mixed forest with dense undergrowth including pine barrens
Wood Thrush	5/25-8/10	Mature forest
Am. Robin	5/1-9/1	Almost anywhere except the most open habitats such as marsh, grasslands
Gray Catbird	5/20-8/15	Dense tangles and thickets
North. Mockingbird	5/5-8/15	Suburban or semi-rural habitats with thickets, brushy forest edges, hedgerows
Brown Thrasher	5/15-8/10	Dry second-growth; powerlines, overgrown pastures, coastal thickets
European Starling	1/1-12/31	Everywhere except remote rural areas
Cedar Waxwing	6/10-8/15	Second-growth forest, parks, orchards, gardens, and margins of waterways
Blue-winged Warbler	5/20-8/1	Old, brushy fields, copses, edge with low undergrowth, powerline cuts
Golden-winged Warbler	5/20-8/1	Damp brushy fields, powerline cuts
Brewster's Warbler	5/20-8/1	Old, brushy fields, copses, edge with low undergrowth, powerlines
Lawrence's Warbler	5/20-8/1	Old, brushy fields, copses, edge with low undergrowth, powerlines

Tennessee Warbler	6/1-8/1	Coniferous forest
Nashville Warbler	5/25-8/15	Open Scrub Oak woodlands (SE), overgrown pastures, bogs (C, W)
Northern Parula	6/1-8/10	Woodlands with *Usnea* lichen
Yellow Warbler	5/25-8/1	Margins of freshwater marsh, other wet brushy areas, farmland
Chestnut-sided Warbler	5/25-8/1	Brushy, open second-growth, edges
Magnolia Warbler	6/5-8/10	Coniferous forest
Black-throat. Blue Warbler	5/25-8/10	Mixed woods with dense understory, esp. Mountain Laurel
Yellow-rumped Warbler	5/25-8/10	Mature White Pines (SE), coniferous forest (C, W)
Black-throat. Green Warb.	5/25-8/5	Coniferous and mature mixed forest
Blackburnian Warbler	5/25-8/5	Coniferous forest
Pine Warbler	5/1-8/5	Variety of pine forest types
Prairie Warbler	5/25-8/1	Brushy fields, powerline cuts, edges
Blackpoll Warbler	6/10-8/10	High elevation spruce, Balsam Fir forest
Cerulean Warbler	6/1-8/1	Mature, moist deciduous forest
Black-and-white Warbler	5/25-8/1	Mainly deciduous forest
American Redstart	6/1-8/1	Secondary forest, copses
Prothonotary Warbler	6/1-8/1	Variety of deciduous or mixed forest types, saplings in field edge bordered by forest, wooded swamps
Worm-eating Warbler	5/20-8/1	Brushy undergrowth of rocky, wooded hillsides and ravines, usually near water
Ovenbird	5/20-8/5	Open forests with little or no understory vegetation and ample leaf litter
North. Waterthrush	5/20-7/25	Wooded swamps, bogs, backwaters
Louisiana Waterthrush	5/10-7/20	Rocky streams in deciduous or mixed forest
Kentucky Warbler	6/1-8/1	Wet thickets, dense understory in moist or wet deciduous forest, bottomland
Mourning Warbler	6/5-8/10	High elevation; dense, early second growth, tangles, esp. raspberry canes in clearcut
Common Yellowthroat	6/1-8/10	Brushy areas, thickets, powerline cuts, preferably wet
Hooded Warbler	6/1-8/1	Moist thickets in woodlands
Canada Warbler	6/5-8/1	Thick undergrowth in moist deciduous or mixed forest; cedar swamp, Red Maple (SE)
Yellow-breasted Chat	6/1-8/5	Thickets, esp. regenerating fields and pastures
Scarlet Tanager	5/25-8/10	Mature deciduous forest
Eastern Towhee	5/1-8/10	Dry, open forest, edge, brushy habitats, including coastal thickets, powerline cuts
Chipping Sparrow	5/1-8/15	Open mixed forest, suburbs, parks, and cemeteries with conifers
Clay-colored Sparrow	6/1-8/1	Shrubby grasslands
Field Sparrow	5/1-8/5	Brushy areas, weedy fields, powerline cuts

Vesper Sparrow	5/10-8/5	Short grass areas, agricultural fields, clearings in pine barrens, coastal moors
Savannah Sparrow	5/10-8/1	Grasslands, including airports, hayfields
Grasshopper Sparrow	5/25-8/10	Grasslands, including airports, hayfields
Henslow's Sparrow	6/1-8/1	Weedy fields, wet meadows
Nelson's Sharp-tail. Sparrow	6/1-8/1	Saltmarsh
Saltmarsh Sharp-tail. Sparrow	5/25-8/10	Saltmarsh
Seaside Sparrow	5/25-8/10	Saltmarsh
Song Sparrow	5/1-8/10	Forest edge, brushy areas, marsh edges, suburbs
Lincoln's Sparrow	6/1-8/1	High elevation boreal bog
Swamp Sparrow	5/1-8/5	Freshwater wetlands including cattail marsh, swamps, river meadow, and pond edges
White-throated Sparrow	5/20-8/20	Scrubby habitats esp with conifers (C, W); Red Maple, Atlantic White Cedar (SE)
Slate-colored Junco	5/1-9/5	Edges in coniferous or mixed woodlands; saplings and brushy thickets at higher elevations
North. Cardinal	4/15-8/20	Suburban or semi-rural areas; forest edge, woodlots, thickets, parks, gardens
Rose-breasted Grosbeak	5/25-8/5	Deciduous and mixed forest, woodlots, shade trees of parks and suburbs
Indigo Bunting	5/25-8/10	Brushy habitats including forest edge, overgrown fields, powerline cuts
Bobolink	6/1-8/1	Grasslands, including airports, hayfields
Red-winged Blackbird	5/1-7/15	Wide variety of densely vegetated freshwater habitats, higher saltmarsh
Eastern Meadowlark	5/5-7/25	Extensive grasslands, including airports, margins of saltmarsh
Rusty Blackbird	5/25-7/25	Boreal bog
Common Grackle	5/15-7/10	Wide variety of urban and rural habitats from open forest to fresh and salt marshes, parks, etc.
Brown-headed Cowbird	5/1-7/15	Virtually all habitats; anywhere host species are found
Orchard Oriole	5/25-7/15	Open, patchy forest, copses, often near river, stream, or pond
Baltimore Oriole	5/25-8/1	Open deciduous forest, shade trees in urban or rural areas
Purple Finch	5/25-8/10	Conifers in mixed woods, suburbs, parklands
House Finch	4/15-8/1	Scattered trees- especially conifers- mainly in residential areas
Red Crossbill	5/1-7/15	Coniferous forest
White-winged Crossbill	5/1-7/15	Coniferous forest
Pine Siskin	5/1-7/15	Conifers
American Goldfinch	6/1-8/1	Forest edge, copses, brushy areas, marsh edges, residential
Evening Grosbeak	5/25-8/15	Mixed forest
House Sparrow	1/1-12/31	Residential, farms

Appendix 3: Bird Behavior and Identification Resources

We have compiled a list of resources for building your birding skills, and references for learning about bird behavior and atlases. **This list will grow as the project grows. Don't hesitate to send us links to your favorite sites/references. We will update registered atlasers of additions to the list over time.**

Map Sources

We have had success getting maps directly from the USGS online store – they are shipped quickly, and they have everything in stock. Their URL is http://store.usgs.gov/

Other Breeding Bird Atlases

Massachusetts Breeding Bird Atlas, online at http://massaudubon.org/birdatlas/index.php
The results of the first Mass Breeding Bird Atlas (1974-1979), including maps and species accounts. Our second Atlas is a repeat of the project on this website.
The New Atlas of Breeding Birds in Britain and Ireland—1988-1991. Gibbons et al. This is the "granddaddy' of second atlas publications. A great publication.
A Google search of "breeding bird atlases" will provide you with links to many other ongoing atlas projects.
The USGS has an interactive site at http://www.pwrc.usgs.gov/bba/ that will link you to data from other completed atlases, and give you access to our current project's data.

Field Guides

These are essential tools for identification—chances are you already have a favorite.
The National Geographic Field Guide to the Birds of North America, 4th edition.
A Field Guide to the Birds of Eastern and Central North America, Roger Peterson
The Sibley Guide to Birds, David Allen Sibley
The Sibley Field Guide to Birds of Eastern North America, David Allen Sibley
Birding Basics, David Allen Sibley. A small primer for advanced identification skills.

Bird Songs Online

http://www.virtualbirder.com/bbestu/index.html
This website can help beginning birders get started. It offers helpful hints about how to remember bird songs, but only has a sampling of species.
http://www.mbr-pwrc.usgs.gov/id/framlst/infocenter.html
The USGS Pautuxent Bird Identification Center provides identification tips and songs/calls for North American birds.
http://www.birds.cornell.edu/AllAboutBirds/BirdGuide
The Cornell Lab of Ornithology online bird guide, including calls, songs and other sounds.

Bird Song CDs/Tapes

Birding by Ear (Eastern/Central) by Dick Walton and Bob Lawson. Great teaching tool for learning how to remember bird song. There is a *More Birding By Ear*, too.
The Singing Life of Birds: The Art and Science of Listening to Birdsong.
by Donald Kroodsma.

Bird Behavior/Natural History

The Birders Handbook. Paul Ehrlich,et al. Second only to a field guide in importance. Indispensable reference for atlasers.

The Sibley Guide to Birdlife and Behavior. David Allen Sibley, et al.

The Birds of North America, Alan Poole, Ed. A thorough summary of all aspects of species' biology and behavior. Print edition is very big. Online (subscription) at http://bna.birds.cornell.edu/BNA/, registered Mass BBA 2 Atlasers get a reduced rate by using

Appendix 4: Time Accounting

The following are a collection of scenarios where volunteers have had questions about their Atlas role, and how to count hours. Some other these situations are:

- William works alone in a block and is the *Primary Atlaser*. He enters the data and hours for the first 20 hours on his Primary checklist. If he sees birds in the block early in the season before he begins his focused 20-hour surveys he enters those birds and hours on his Supporting field card. He can re-find those birds when he begins his focused Primary surveys.
    - After William finishes his Primary Atlaser surveys, he can quit the block, or he can keep a role as a Supporting Atlaser in the block and "mop up" species over the next year or so.
    - If other people are assigned as Supporting observers in the block, they record their information on their own Supporting checklist. They keep track of their own hours. Their hours and sightings count toward the totals hours for the block, but not toward the 20-hour Primary surveys.
    - You should not enter birds as Incidental for those blocks where you are assigned to as a Primary or Supporting Aatlaser. Use the Supporting card.
- Lucy and John J. always work together toward their 20-hour, Primary Atlaser goal. For the sake of the database only one person can be listed as the Primary Atlaser, but the other person can be listed as a Helper. Each hour they spend together in the field counts as one hour, because they are always together.
    - After they complete hour 20, they switch to their new Supporting checklist, and they continue to record time spent in the block, upgrades and new species on that card.
    - If Lucy and John J. decide to work apart, they each need their own Supporting Atlaser cards.
    - If other people get additional sightings in the block, they record their information on their own 20+ cards, too.
- Roger and Ludlow are one team, and Edward and Louis are a second team in the same block. They are not birding in the same place, but they are communicating with each other about where they are atlasing and what they are finding in the hope of finishing the block quickly. If the Primary Atlaser is Ludlow, and he wants to include the data that both teams collect on the 20-hour checklist, he must be in close communication with them, and he needs to record all the sightings from both teams on the 20-hour checklist. After the 20-hour threshold has been met, all teams switch to 20+ checklists for that block. For each team that stays together, one hour counts as one hour.

- Lars is a Primary Atlaser, and lives in the same block. He is going to begin his Primary Atlaser surveys on June 3, but he keeps running into breeding birds before that date. He records all those early sightings on his Supporting Atlaser card, and goes out and re-finds those birds during his 20 hours of Primary surveys.

    - If he finds birds while not atlasing he records them on the Supporting field card, but he doesn't have to count the hours.