



MINNESOTA BREEDING BIRD ATLAS VOLUNTEER HANDBOOK

Minnesota Breeding Bird Atlas Project
March 12, 2009 Version

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Welcome to the Minnesota Breeding Bird Atlas!

Breeding Bird Atlases are essential for bird conservation because they document and map the distribution and abundance of breeding birds. They also make the information more accessible for research, conservation planning, and for all interested bird enthusiasts. Over the next five years (2009-2013), hundreds of volunteers will conduct bird surveys throughout Minnesota and document the breeding behavior they observe. Results from the Minnesota Breeding Bird Atlas (MNBBA) will provide a comprehensive list of all breeding species that occur in the state and maps of their breeding ranges. Currently, 225 species are considered breeding species within the state.

Minnesota has many avid birders who are essential to the success of this project. But there are growing numbers of birdwatchers throughout the state, with all levels of experience, who also can contribute. The Minnesota BBA is a great way for anyone to enjoy, share, and increase their interest in birds and contribute to bird conservation.

Goals

The Minnesota BBA is intended to accomplish the following goals:

- Delineate the distribution of all breeding birds in Minnesota
- Increase monitoring efforts for bird populations
- Generate new local discoveries
- Create Geographic Information System (GIS) layers that enable detailed assessments of bird distributions
- Facilitate the creation and testing of models that predict bird distribution and abundance by habitat
- Engage the public in bird conservation issues
- Increase opportunities for citizen scientists to contribute to avian science

Regional Coordinators

The state is divided into 32 Atlas regions (Appendix A) with one or more volunteers responsible for coordinating atlas activities within each region. The role of the Regional Coordinator is to ensure that all priority survey blocks (See Atlas Structure: Survey Areas: Priority Blocks) within the region are covered within the duration of the project. Regional Coordinators recruit local surveyors, provide support to surveyors, provide local bird and habitat expertise, monitor survey progress and review results for reliability (See Appendix B for a list of Regional Coordinators and their contact information).

Atlas Surveyors

Surveyors are the backbone of any atlas project. They begin by signing up to cover one or more Priority Blocks. Once their selection is made they: explore the habitat and access points within each block by map, car, or on foot; observe birds in all the habitat types present (no need to survey the entire block); and record evidence of breeding behavior for every different species observed (e.g. carrying nesting materials). The goal, by the time the surveyor completes the block, is to record a breeding status code for every species observed and/or heard in the block. Surveyors do not need to be expert birders to participate. The success of the atlas depends on the help of all individuals interested in Minnesota birds. (For answers to Frequently Asked Questions about being a Surveyor, see Appendix C). In appreciation for their commitment each block owner will receive an MNBBA sleeve patch.

Field Observers

Individuals also can contribute breeding bird observations from any place in the state (e.g. their own backyard or a favorite park where they hike or camp). These individual observations, called incidental observations, are important in helping to delineate the statewide breeding distribution of all Minnesota's birds.

Overview of Atlas Process

The following paragraphs provide a broad overview of the four steps in the Atlas process. In the next section, "How to Conduct a Survey", each of these steps are discussed in greater detail.

Step #1: Find and Sign-up to Own one or more Priority Blocks

Browse the website (www.mnbba.org) to check out the survey areas, called Priority Blocks, where you live or where you would like to survey. Priority Blocks are identified by their Township/Range number and a quadrant letter code. For example, T123 R20a identifies Township 123, Range 20. A lower case "a" means it is the NE quadrant.

If you have a good idea which area you plan to survey, you can also go directly to the link on www.mnbba.org to locate for a block and follow the directions to review and request an available block. Your request is sent to the Regional Coordinator for confirmation.

Another option for finding a Priority Block is to check with the Regional Coordinator in your area (see Appendix B) who can recommend a block. You can then proceed to register for that block. If you do not have access to a computer, ask a friend to help or talk with your Regional Coordinator.

Step #2: Scout and Explore Your Block

Remember the goal of every block survey is to report as many species as you observe with the strongest evidence of breeding by covering all the habitat types in the block. However, you do not need to cover the entire block (whew!) There are three things to consider as you get familiar with your block: habitat, access, and property ownership.

Habitat

Check out the block to identify the different types of habitat present: e.g. urban areas, wetlands, row crops, grassland, and woodland. Different habitats provide nesting habitat for different species. Survey birds in every different habitat that you identify.

Access

When you have a good idea of which habitat areas you want to cover, look for access to those areas. Are there roads, walking paths, or canoe-able waterways you can use? What's the best way to get to where you want to go to find as many species as you can? Some places may provide habitat for many species – or you may know a place where you might find an uncommon species. As you get more familiar with your block, you might find new places to look for birds.

Land Ownership

As you explore your block it is essential that you respect private property. Use only public access to public land unless you have permission from a private property owner to survey

there. If you think you may be missing critical habitat by avoiding private property, request permission from the landowner. Your Regional Coordinator can help you to identify who owns the property. In some cases, there will be property that is off-limits so the Atlas cannot survey on that property.

Step #3: Get Out and Bird!

This is what the Atlas is all about. The survey goal for every block is to record as many different species as the surveyor finds within the block and the strongest breeding evidence for each species (e.g. adult carrying nesting material). To accomplish this, make multiple visits to your block to look for as many species as you can find. Visiting at different times of the day during the breeding season will improve your chances of finding the most species.

Use the MNBBA Field Card to record your observations. Surveyors observe bird behavior and record the code that describes what they see. A list of breeding evidence codes are in Appendix D. Each breeding evidence code belongs to one of four status levels: Observed, Possible, Probable or Confirmed. Our goal is to document Confirmed observations in each block for as many species as possible.

Don't forget to document your effort (time and mileage) as well. Remember:

- For all observations record the species seen and the breeding evidence code.
- For special species some additional information is required.

Step #4: Submit Your Observations

Finally, you need to add your observations to the database. We encourage you to enter your data online after every visit. If you are not comfortable working online, you can have a friend enter the data or you can send your data sheets to your Regional Coordinator or someone they designate.

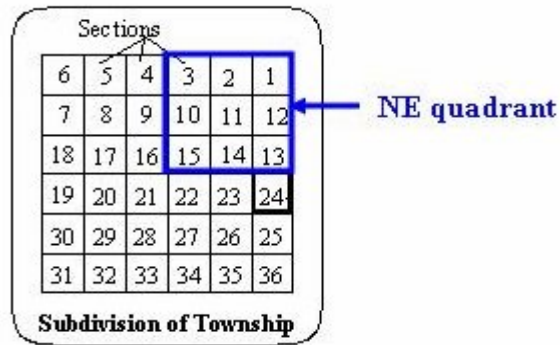
Atlas Structure

Survey Areas

Priority Blocks

Surveys will be conducted in predetermined areas to ensure that the atlas covers the entire state. Volunteers will survey every corner, but not every inch, of the state. Most Atlases use a grid system to determine the survey area. Minnesota chose the U. S. Public Land Survey System to select these areas. The Public Land Survey System is based on a 36 square mile area called a township. Townships are subdivided into 36 sections (each 1 mile by 1 mile). To reduce survey bias, the Minnesota BBA randomly selected the NE quadrant (3 miles by 3 miles) of every township in the state to survey. These predetermined areas are called Priority Blocks.

U.S. Public Land Survey Township



Rivers, borders, or occasional variations in the grid system can create townships less than 36 square miles. In cases where the NE Priority Block was not complete, we selected the SE quadrant or continued clockwise to select a complete quadrant. If the township had no complete quadrants, the township was excluded from the MNBBA.

Secondary Blocks

Secondary blocks (quadrants in the township outside the Priority Block) may also be surveyed where habitat present in the township is under-represented in the Priority Block or when special sites do not fall within the Priority Block. Special sites include National Wildlife Refuges, State Parks, State Scientific and Natural Areas or Important Bird Areas. Regional coordinators can help surveyors identify these special sites.

Incidental Observations

Anyone can report bird observations anywhere in the state. When the data are submitted, field observers will need to provide location information.

Safe Dates

A large proportion of Minnesota's breeding birds are migratory species and the timing of their migrations through the state often overlaps with the breeding season; some individuals of a given species are migrating through the state while other individuals are breeding. For example, an individual bird seen in late May might be a local breeding bird or it could be a migrant on its way to more northerly breeding grounds. To reduce the possibility of incorrect reporting, safe dates are provided at www.mnbba.org to help exclude observations of non-breeding individuals during pre-or post-breeding movements through the state. If a bird exhibits behavior in the Observed or Possible breeding code categories, but the timing is outside the safe dates for that species, do not record that species. The individual may be migrating through. However, breeding evidence can always be recorded outside of safe dates for Probable or Confirmed observations.

Key points to remember about safe dates:

- Safe dates do not define a species' breeding season.
- Safe dates are, at best, professional estimates averaged for the entire state.
- Safe dates only apply to records in the "Observed" and "Possible" categories. Observations in the "Observed" and "Possible" categories that are outside of the safe dates will not be accepted.
- Safe dates do not apply to "Probable" or "Confirmed" observations.

The figure below shows safe dates for a hypothetical Minnesota breeding bird (Species A). Note that safe dates do not define the full breeding season, but rather a smaller portion of the season after pre-breeding movements (mostly spring migration) and post-breeding movements (fall migration and post-breeding dispersal) have been considered. Approximate safe dates for each species can be found in the list of expected species for each landscape region on the MNBBA website as well as in the complete list of all species that breed in the state.

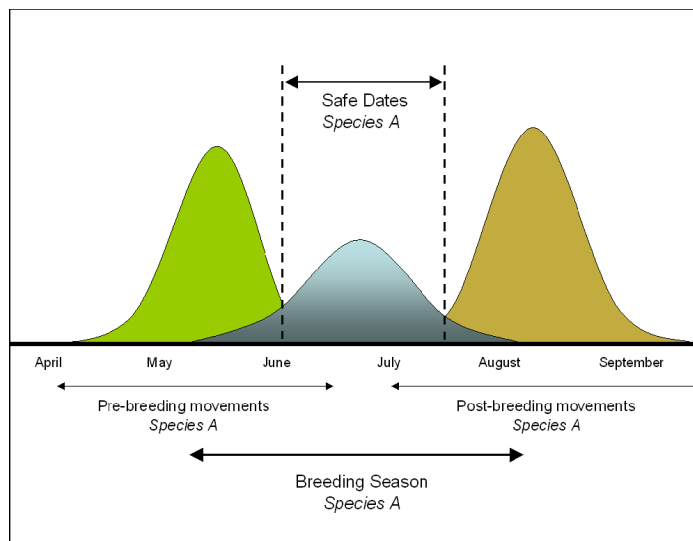


Figure courtesy of 2nd Pennsylvania BBA

Special Species

Atlas surveyors will conduct the survey and record their observations in the same manner for the majority of species that they encounter. However, for a select number of species the method of survey and/or the information that is recorded will vary.

Species with Survey Challenges: Owl and Marsh Birds

Because most owls are nocturnal and many marsh birds are secretive, these species are normally difficult to detect. The MNBBA wants to increase their detection rate. To improve the likelihood of finding these species review Appendix E for owls and Appendix F for marsh birds.

Species that Require Additional Data

- Species of Conservation Interest

Birding organizations and government agencies maintain a variety of different lists as a way to highlight species that are rare, vulnerable to disturbance, and/or declining in abundance for conservation purposes. The MNBBA has identified 49 Species of Conservation Interest in Minnesota (Appendix G) from a variety of these sources.

- Colonial Waterbird Species

Many waterbird species, such as grebes, herons, egrets, terns and gulls (for complete list see Appendix H) nest in colonies. For these species surveyors will be asked to estimate the number of nests and/or adults and to record the colony location. Colonial waterbird species that are very rare, such as the Snowy Egret and Common Tern, are not included on the list in Appendix H because they will require completion of a verification form (see below).

- Species to Verify

The Technical Committee also confirmed 42 species as rare in Minnesota (Appendix I) because they are rarely seen in the state (e.g. casual, accidental and former breeding species). These species will require completion of a MNBBA verification form.

The additional field documentation required for "Species of Conservation Interest" and "Species to Verify" is discussed in the section on How to Conduct a Block Survey: Recording Breeding Bird Data.

Web Sites

All information about the Atlas is accessible from the MNBBA website (www.mnbba.org). This is an informational site and the portal to our data base. Look here to find Priority Blocks in your area of interest, how you can participate in the project, contact information, and most importantly, materials and instructions for our volunteer surveyors. We will also publish project news and update atlas materials as the project progresses.

From the Minnesota website, surveyors have access to our database managed by Cornell Lab of Ornithology. On the Cornell site, surveyors will sign-up for their Priority Blocks, enter their observations, and review their results. In addition, from this website Regional Coordinators and Atlas administrators can review the project progress and the observations submitted to-date. This is also where survey results will be available for participants and the public.

How to Get Involved

Joining the project is easy to do from the MNBBA website, www.mnbba.org. Just look for the Registration button.

To contribute breeding bird observations, Atlas Surveyors and Field Observers need to be registered. Just create a user name and password and enter your email address.

If you already contribute to eBird or other Bird Source project, you do not have to re-register; you can use your current user name and password.

Registration creates a sign-on account that tracks observer data and effort, and enables review and updates to observations. Accounts for Priority Block surveyors also provide information on progress in the block and notification of messages related to block data.

How to Conduct a Block Survey: Details

Identify the Priority Block you want to Survey

Use the block finder on www.mnbba.org, or contact the Coordinator for the Region, to identify which of the 2352 Priority Block/s you plan to survey. Topographic maps and aerial photo maps of each block are available through the Atlas website and can easily be printed. You can also contact the Regional Coordinator to help you choose a Priority Block. Regional Coordinators will have county highway maps with Priority Blocks marked and will have county plat books to help identify land owners if you need to inquire about permission to survey on private property.

Once you select the block(s) you want to survey, use the Priority Block ID (e.g. T115R3a) to sign-up for the block on the Cornell website or contact the Regional Coordinator. Then be sure to print a topographic map and/or an aerial photo, depending on what works best for you.

Scout or Explore Your Block

Identify Access Points

The first step is to familiarize yourself with the maps that are available for your block. These will provide an initial assessment of available access points to the area. In most regions of the state, county roads, delineated on the county highway maps, can provide primary access. In the more remote areas of the state, however, logging roads and/or trails may be particularly important. Some of these may be displayed on recreational maps but an initial site visit before you begin the survey will help you locate additional sites. Remember to always be careful stopping on busy roads (see section on Field Safety) and, if you head off-road, to bring along maps and a compass. In some areas private lands may provide key access to important habitats that you want to sample but never enter private land without permission (see section on Atlasing and Land Ownership below).

Explore the Habitats within Your Block

Fall or early spring is a great time to get out and explore your block. Review the maps or explore the area by car or on foot. Look for different habitats (e.g. coniferous forest, wetlands, open grasslands, open water) because you will need to look for breeding birds in

a representative area of each habitat to increase the probability of finding all the breeding species. You may want to circle different habitat types on the map with a colored pencil and highlight any unusual features, such as parks, bridges, cemeteries or grain elevators, to be sure to survey those areas as well. A good rule of thumb is to stop every half mile within a similar habitat to listen and look for birds. For guidelines related to specific habitats, see Appendix J. This is your chance to discover some new, great birding sites.

Atlasing and Land Ownership

It is essential that Atlas Surveyors do not survey on private property without permission. Most folks are only too happy to let you on their property once they understand the project. Just remember to be courteous and that it is important for the entire atlas project for you to show a positive and respectful attitude. Oftentimes the landowner knows a great deal about the birds on their property and can be very helpful. If they allow you access, let them know when to expect you and follow-up by providing them a thank you and a list of birds you documented on their land. Provide them with contact information should they observe any birds that you were unable to document.

If the landowner is not available, you can send a letter requesting permission. Appendix K is a copy of a standard request for permission. It is also available from the MNBBA website.

There will be some landowners who do not grant you permission to enter their land. Be respectful of their wishes and do not press the issue further. We expect that we will not be able to gain access to all private lands in Minnesota's Priority Blocks. This will not compromise the success of the atlas.

Minnesota's landscapes include a wide diversity of land ownerships. A brief discussion of additional points to consider when entering both public and private lands can be found in Appendix L. A copy of this, as well as a copy of Minnesota's trespass laws, can be found on the MNBBA website.

Survey Preparation

Review Expected Species

If you need to review species expected in your survey area you can find the following resources on the MNBBA web site:

- First, you will find a compilation of three lists, one for each landscape region (http://files.dnr.state.mn.us/natural_resources/ecs/province.pdf) that delineate the species expected in that region. Each list includes a four character shorthand code for the species' full name, safe dates, comments on the species distribution within the landscape region, and a broad characterization of the species habitat.
- Second, are two lists, one for Species of Conservation Interest and one for Species to Verify, that describe where, geographically in the state, surveyors might expect to find these species.
- Third, is one complete list of species known to breed in the state, their safe dates and additional information regarding habitat requirements.

Summer season county maps maintained by the Minnesota Ornithologists' Union also are a great resource for identifying Minnesota birds known to occur in each county:

(<http://moumn.org/cgi-bin/occurrence.pl?season=Summer>).

Additional background information that will help you anticipate when and how you might conduct the survey for different groups of species can be found in Appendix M. For example, although dawn surveys are the best time to hear most breeding songbirds, evening is the best time to look for nighthawks in urban areas.

If you need to review the field marks, songs, and calls of the species in your area, there are many great field guides and song identification CDs and DVDs listed on the MNBBA website.

Become Familiar with Codes and Forms

Data organization and accuracy are key aspects of surveying and successfully completing an atlas block. Three forms are available to every atlas volunteer:

- Field Card

A separate field card (Appendix N) is required for each visit to the Priority Block. Recording the date, time of day, weather conditions, miles travelled, and the length of the visit, are important documentation for the surveyor and the BBA effort. The card provides space to document each species observed and to record the breeding evidence code with room for any additional comments or notes. The card also includes the list of breeding evidence codes for easy reference.

The field card is the most important recording form. Before you head out to the field for your first visit, review the information required on it. You will need to keep track of mileage (include both the mileage driving within the block as well as the mileage traveled to and from the block) and both your non-survey (driving, lunch) and survey hours which means remembering to write down both the Start and Stop miles and times.

The field card can also be used to record incidental observations and their location. For incidental records made while traveling through several different Atlas blocks or by casually watching birds in your backyard, we ask that surveyors assign an "effort" of 15 minutes for each reported set of observations as an estimate of the time it may have taken to make, record, and report the data. Location information (comments or GPS coordinates) should be sufficient to relocate the observation on a map.

Note: The Field Card will have a great deal of valuable information. Losing field cards and all the data they contain is something to avoid at all costs! To prevent loss of critical data, it is recommended that field data are submitted on the website as soon as possible after they are collected to provide an added measure of data "safety". Surveyors may want to make photocopies, especially if they are submitting records on paper.

- Reference Card

The first side of the field Reference Card (Appendix O) is a complete list of all expected breeding species in the state and identifies the special species that require additional information: Colonial Waterbirds, Species of Conservation Interest, and Species that require Verification. The second side of the card includes the habitat codes required for confirmed observations for the Species of Conservation Interest. Check this reference card to remind yourself what is required if you come across a species that is not common.

This card will be helpful to bring on all the surveyor's block visits. It might be useful to laminate it.

- Verification Form

The process for verifying rarities (Appendix P) is still in development.

Planning When to Survey

Evidence from other states suggest that spending about 25 hours in a block actively searching for breeding birds should enable you to document about 75% of the expected species in the block. This estimate could vary depending on your skill level, the diversity of habitat in the block and the ease of access to different habitat types. Plan to visit the block multiple times throughout the season and be sure to survey all the different habitat types.

- Time of Year

Since the Atlas seeks to document the distribution of Minnesota's breeding birds, the majority of atlas survey work will take place from March through August. Most Minnesota birds breed from late spring through summer so as a general rule most atlas activities occur from late May through July. Late May through June are excellent times to hear and located singing males; July is an excellent time to observe juvenile birds which will confirm breeding.

We suggest you spend a few hours in March and April to look for breeding owls, raptors, and woodpeckers. While you are out in your block/s listen for other early breeding species

- Time of Day

Birds are most active during the morning so a majority of your survey effort should be concentrated in the morning hours. However, some time should also be devoted to birding just after dusk and into the early evening to document nocturnal species that might otherwise be missed during the day.

- Weather Conditions

Surveys should be run under satisfactory weather conditions. Avoid rainy, very windy, or very cold (below freezing) conditions. Occasional light drizzle or mist may not affect bird movement or calling but steady drizzle or heavy fog should be avoided. If the weather is interfering with your ability to see or hear birds, call it a day and plan another visit.

When you and your Regional Coordinator agree you have spent sufficient time and effort strategically searching for breeding birds in a block, we encourage you to look for another Priority Block to 'adopt'.

Recording Breeding Bird Data

Remember that the goal is to complete the Priority Block with the strongest evidence possible for every species observed. The list of evidence codes (Appendix D) is in order of weakest to strongest evidence. Once you have documented breeding evidence for a species, you do not need to record that species for that block again unless you upgrade to a stronger evidence code (e.g. was Possible [X] but now you see birds of that species carrying sticks to a nesting site so you change the Evidence Code for that

species to 'CN'). The atlas wants to collect all evidence codes of a species documented throughout the breeding season.

Which forms to use

Atlas surveyors have two options for recording their field data:

1. Use a new Field Card for every visit you make to your block.
2. Use your own field notebook and transcribe the data later onto the Field Card or submit it directly online.

Remember to Record Your Efforts

Complete the block information, date, time, and mileage.

For each species you see:

1. Write the common name (or alpha code) under the Species Name column.
2. Enter the breeding evidence code for that species, based on your observation. Record only what you actually observe; when in doubt, choose the more conservative of two or more applicable breeding codes. You can always return to the block to try and upgrade the evidence of breeding. Once you have confirmed nesting for a species in the Priority Block no additional data needs to be gathered.
3. For Special Species

Additional information requested for species that are rare (species to verify), colonial, or of conservation interest is recorded in the Notes column. The Field Reference Card (Appendix O) provides a reminder of the required information and the list of Habitat Codes.

- Reporting Type: Species of Conservation Interest (Appendix G)

Only for observations of Confirmed evidence of breeding, include the habitat code (on the back of the reference card, Appendix O) that describes the landscape where the bird was observed. Enter the habitat code in the notes column for that species.

Habitat codes are important for improving our knowledge of the habitat requirements of these species of interest. The habitat codes are three character codes. Use the code that best describes the habitat where your observation is made. If you are not familiar with the detailed habitat descriptions, use the three character code that ends with "X", a more general description.

- Reporting Type: Colonial Species (Appendix H)

Enter an estimate of the number of adults and/or nests in the colony in the Notes column and record the location. Location is required.

These species only or often nest in colonies and are not on the State Rarities list. In situations where there is only one nesting pair of these species, enter "one nesting pair" in the Notes field. A colony is defined as more than one nest in close proximity (two Common Loon nests on a lake are not 'in close proximity').

- Reporting Type: Species to Verify (Appendix I)

Document detailed notes and the location for each sighting of species on this Reporting Type list. For these species completion of a Verification Form and location are required. (March 09. Details for this process are not yet final.)

Recording Location for Colonial Species and Species to Verify

Location can be documented either using GPS Coordinates or a block map.

If you have a GPS unit, either record the location as a waypoint in the GPS unit to retrieve when you enter your data or write the coordinates in the Notes field on the Field Form. When you enter the location information online, you will be asked to record them in decimal degrees.

If you do not have a GPS unit, identify your location by putting a mark on your block map. When you enter the location information online, you can click on the location on an image of your block.

Submit Your Data

Instructions coming later.

Ethics and Safety

Birding and Atlasing Ethics

(credit to the Ohio Atlas Project for the following information)

Some atlas activities might impose certain stresses on breeding birds, and all such activities should be kept to a minimum. Since one of the main goals of a breeding bird atlas is to confirm breeding, active nests or parents with fledglings may be encountered. If a nest is found, be sure to minimize disturbance to the nest, adults, young birds, and the surrounding vegetation. There is a variety of breeding evidence codes that will confirm breeding, so searching for the location of nests is not necessary.

If you suspect that a bird is breeding in a particular habitat patch, take some additional time to watch that bird's behavior. It might reveal the presence of a nest or young without the need to disturb the nest or vegetation concealing the nest site. For example, repeated visits by an individual bird to a particular location, such as a dense hedgerow or nest cavity, represent probable breeding (code 'N'). Increasing the confirmation level for this species could be accomplished by simply observing the bird carrying nest material (code "CN") or carrying food (code 'FY'), both of which confirm breeding for that species without encroaching upon the nest location. Another possibility would be to note the location of the likely nest and revisit the site in a few days. Please note that you should be especially careful if the adults are very upset by your presence. Increased adult activity near a nest site may attract nest predators such as jays, crows, accipiters, and a variety of mammalian predators.

The MNBBA discourages the use of playback tapes and understands that a great deal of controversy accompanies the use of tape playback to attract birds. In some unusual cases, if used correctly and very sparingly, it can be a useful tool for detecting elusive species in some situations. Brief (~20 second) tape playbacks to naïve individuals (those which are unlikely to ever hear another tape recording) should not have detrimental effects on an individual bird. However, it is important to note that tape playbacks should never be used in areas that are birded heavily, such as metro parks, state parks, or state nature preserves, and never for threatened or endangered species.

Special care should be taken when surveying for rare species, and nests should never knowingly be approached. Observing these species at a distance can, in many cases, yield breeding confirmation without the direct observation of nests, eggs, or young birds.

Field Safety

Whether you are birding in the agricultural landscape of southern Minnesota, the urban landscape of a city, or the dense forests of northern Minnesota, birding is a fun and healthy outdoor activity. Like all outdoor recreational activities, however, it is important that certain precautions are taken to ensure that the experience is both enjoyable and safe and that you are prepared for any hazards that may arise. Your personal safety should always be your top priority. Following are some important safety considerations to remember:

- If you are working in remote areas always make sure that someone knows where you are going, how long you expect to be gone and when you expect to return. Also remember to bring good maps and a compass or GPS unit.
- Include a vehicle safety kit in your car that includes such items as traffic warning devices, fire extinguisher, flashlight with fresh batteries, etc. If you are travelling far, always insure that your car is in good working order including all fluid levels have been checked, spare tires are inflated, tire changing tools are in good working order, etc.
- Always check weather conditions and forecasts before leaving home. Know the appropriate precautions to take in severe weather, including electrical storms and tornadoes. Be aware of areas prone to flash flooding, particularly in southeastern and northwestern Minnesota.
- Have a first aid kit available in the car and, when hiking, in a backpack.
- Be very careful when you stop along the roadside to look and listen for birds. Make sure that you have pulled the car safely off to the side of the road and place the flashers on. If you get out of the car be very careful and stay on the front side of the vehicle. It also would be a good idea to wear a brightly colored vest with reflective strips. Never make a road-side stop along interstates, roads with heavy traffic (especially narrow roads), or in locations close to blind curves.
- Always bring plenty of water along with you. Even when it isn't sunny and hot your body needs proper hydration.
- Biting insects are of course common in Minnesota during late spring and summer, including ticks, mosquitoes and black flies. Some can also carry a variety of diseases. Try to limit your contact with biting and stinging insects by wearing repellent, long sleeves and long pants. Stuffing your pants into your socks creates a

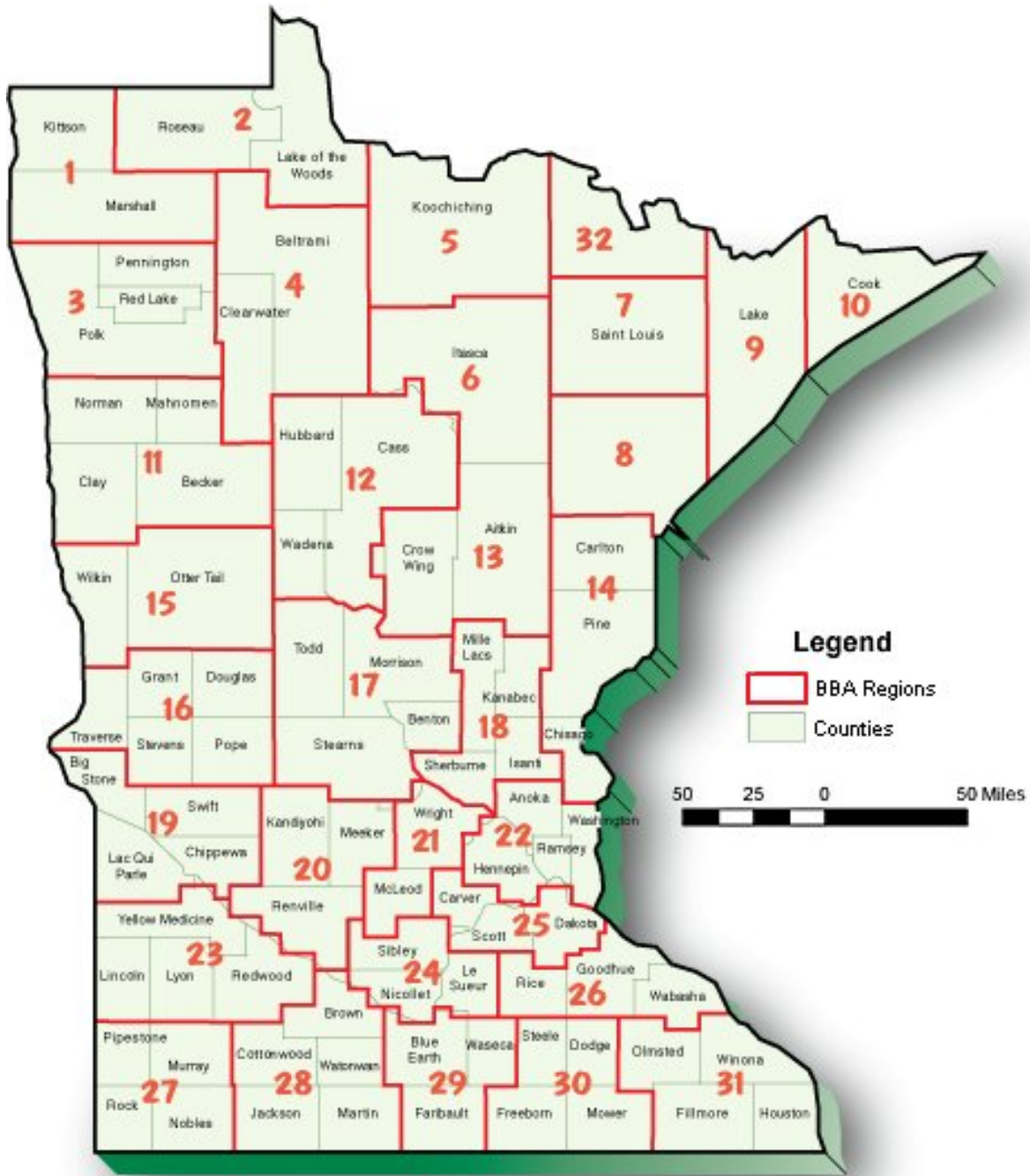
good tick barrier as well. The Minnesota Department of Health maintains a good web site about insect borne diseases and methods for prevention (<http://www.health.state.mn.us/diseases.html#type>).

- If you are off the road or off the trail, be able to identify poison ivy and poison sumac and make all efforts to avoid them.
- If you have a cell phone always bring it with you though know that there may be some areas of the state where service is not reliable (which is why it is always important to let someone know where you will be).
- If you do not feel safe surveying particular portions of your atlas block don't do it. Contact your regional coordinator or the project coordinator to let them know your concerns. They should be able to arrange for someone else to help you and/or find someone else familiar with the area to take your place.

Finally, a suggested checklist of things to remember before you go into the field is provided in Appendix Q.

Appendices

Appendix A: Map of Minnesota Breeding Bird Atlas Regions



Appendix B: Minnesota BBA Regional Coordinators

Atlas Region	Counties	Regional Coordinators	Email	Phone
1	Kittson, Marshall			
2	Roseau, Lake of the Woods			
3	Polk, Pennington, Red Lake			218.286.5649
4	Beltrami, Clearwater	Christine Sousa	christine.sousa@dnr.state.mn.us	218.308.2285
5	Koochiching	Lee Grim	clgrim57@charter.net	
6	Itasca	Shawn Conrad	itascabirder@gmail.com	
7	St. Louis, central	Bill Tefft Norma Malinowski	b.tefft@vcc.edu normarj@frontier.net	218.235.2197 218.365.0825
8	St. Louis, south	Jan Green	jgreen@d.umn.edu	218.525.5654
9	Lake	Jim Lind Dave Grosshuesch	jslind@frontiernet.net dgrosshuesch@fs.fed.us	218.834.3199 218.525.7253
10	Cook	Kate Kelnberger Jeremy Ridlbauer	kkelnberger@boreal.org sundew@boreal.org	218.388.9908
11	Norman, Mahnomen, Clay, Becker			
12	Hubbard, Cass, Wadena	Stacy Trapp	srtrapp@hotmail.com	952.423.9708
13	Crow Wing, Aitkin	Bee-Nay-She Bird Club		
14	Chisago Carlton, Pine	Ann Kessen Sparky Stensaas	kess0010@tc.umn.edu sparkystensaas@hotmail.com	651.462.8487
15	Wilkin, Ottertail			
16	Traverse, Grant, Douglas, Stevens, Pope			
17	Todd, Morrison, Stearns, Benton			
18	Mille Lacs, Kanabec, Sherburne, Isanti			
19	Big Stone, Swift, Lac qui Parle, Chippewa			
20	Kandiyohi, Meeker, Renville	Randy Frederickson	fredericksonr@willmar.k12.mn.us	
21	Wright, McLeod	Suzanne Maki	smaki@hutchtel.net	320.587.0011
22	Anoka, Hennepin, Washington, Ramsey	Lee Pfannmuller	leepfann@msn.com	612.810.1173
23	Yellow Medicine, Lincoln, Lyon, Redwood			
24	Sibley, Nicollet, Le Sueur			
25	Carver, Scott, Dakota	Steve Weston	sweston2@comcast.net	651-454-9372
26	Rice, Goodhue, Wabasha			
27	Pipestone, Murray, Rock, Nobles			
28	Brown, Cottonwood, Watonwan, Jackson, Martin	Eric Harold	gentilis03@yahoo.com	
29	Blue Earth, Waseca, Faribault			
30	Steele, Dodge, Freeborn, Mower	Pete Mattson	pmmattson@yahoo.com	507-567-2570
31	Olmstead, Winona, Fillmore, Houston	Joel Dunnette Carl Greiner	jdunnette@kmtel.com cgreiner@mchsi.com	507-269-7064 507-867-0119
32	St. Louis, north	Bill Tefft Norma Malinowski	b.tefft@vcc.edu normarj@frontiernet.net	218.235.2197 218.365.0825

Appendix C: Atlas Surveyor Frequently Asked Questions

What skills do I need?

To adopt a Priority Block, you need to be able to identify most of the species expected to breed in that block. However, you do not need to be an expert birder. You can take your field guide, a friend, a mentor, or other identification help into the field (no audio recordings or pishing, please) and identify species as they occur. It may take a bit longer, but you will learn a lot and learn it quickly. For expert birders, the survey will go more quickly.



2009 sleeve patch

How much time will it take?

We expect each Priority Block owner to visit their block throughout a breeding season and to cover a diversity of habitats, times of day, and range of breeding dates appropriate for the expected species. Block effort is hard to predict because it depends on the skill of the surveyor, the ease of access to the block, the diversity of habitat within the block, the weather conditions, and the number of potential breeding species. The best estimate from other states is that it takes about 25-30 hours between March and August to complete a block.

How do I find a block to survey?

Survey blocks were determined to be the NE quadrant of every township in the state, although there are a few exceptions. Early in 2009, maps will be available either online or by request from your Regional Coordinator or the State Coordinator.

How do I do this? What do I report?

For every species observed, you record a code that describes whether there is evidence of breeding (e.g., singing male heard in suitable habitat, birds carrying nesting materials, recently fledged young,). For special species (e.g. species of conservation interest, colonial waterbirds) additional information will be needed. The goal is to document as many species as you can with the highest level of breeding evidence you observe. There is a Handbook in development with instructions for surveying your block. Additional tips and guidelines will be available in printed form or online plus some training will be available.

When do I conduct my survey?

Since the Atlas will document Minnesota's breeding birds, surveys are conducted between March and August. Because most Minnesota species breed between late-spring through the summer more survey work will be done in June and July. Remember, some species are most active early in the morning, others are more active at dusk, so be sure to make some visits at different times of the day.

Where can I go for help?

Your first point of contact is the Regional Coordinator for your area. As those roles are filled, you can find their names and contact information on an upcoming MN BBA website. You can also contact the state Atlas Coordinator:

Bonnie Sample, MN Breeding Bird Atlas Coordinator
651-739-9332
bsample@audubon.org

Appendix C: Continued

Steps To Complete a Priority Block Survey

- ❑ Find a Survey Block/s
 - Find block/s you may be interested in surveying using maps and aerial photos available on the Atlas website when it becomes available early in 2009 or from the Regional Coordinator in your area of interest or check with the State Atlas Coordinator.

- ❑ Scout and explore the block
 - Identify habitat types and locations.
 - Find access to different habitat types.
 - When property is privately owned, get permission before surveying. Letters will be available.

- ❑ Get out and bird!
 - Identify all the different species you see and watch their behavior.
 - Record a breeding status code based on what you see and hear.
Breeding status levels: Observed, Possible, Probable, Confirmed.
 - For species of conservation interest with confirmed breeding status, record the habitat.
 - For colonial birds, estimate the number of adults or nests and record the location.
 - For rare species, complete a verification form and record location.

- ❑ Submit observations
 - Enter the data online or mail your paper form. Instructions for both types of submissions will be available closer to the start of the season.

For questions, contact:
Bonnie Sample, MN Breeding Bird Atlas Coordinator
651-739-9332
bsample@audubon.org

Appendix D: Breeding Evidence Codes

Category	Code	Evidence
Observed	O	Species observed in a block within safe dates, but no evidence of breeding. Use this code for species not in suitable nesting habitat. For example, this code could apply to raptors or gulls flying over, herons foraging with no indication of a rookery, or ducks summering on a pond.
Possible	X	Species encountered in suitable nesting habitat within safe dates such as a Virginia Rail in a marsh. This code would also be used when you hear a male singing in a likely nesting area on only one occasion.
Probable	M	Multiple (5 or more) singing or territorial birds of a species detected within same block on the same day. Most species listed as (M) can be upgraded to (S) during a later visit.
Probable	S	Singing male present at same location at least 7 or more days apart.
Probable	P	Pair observed in suitable nesting habitat within safe dates.
Probable	T	Permanent territory presumed through defense of breeding territory by fighting or chasing individuals of same species.
Probable	C	Courtship or copulation behavior, includes displays or transfer of food.
Probable	N	Bird observed visiting the same likely nest site repeatedly, but insufficient behavior for upgrading to Confirmed. Especially useful for cavity nesters or for a shrub-nesting species that flies into the same thicket and disappears on several occasions.
Probable	A	Agitated behavior or anxiety calls from adults usually indicate a nest site or young in the vicinity.
Probable	B	Nest building by wrens or excavation of cavities by woodpeckers.
Confirmed	PE	Physiological evidence of breeding based on bird in the hand such as a highly vascularized swollen incubation (brood) patch or an egg in the oviduct. Used primarily by bird-banders.
Confirmed	CN	Bird seen carrying nesting material such as sticks, grass, mud, cobwebs, etc.
Confirmed	NB	Nest building seen at the actual nest site, excluding wrens and woodpeckers
Confirmed	DD	Distraction displays, defense of unknown nest or young, or injury feigning. Killdeers may give a "broken wing" act, a Red-winged blackbird may dive at you near the nest site, or an Ovenbird may run about with wings fluttering.
Confirmed	UN	Used nest or eggshells found. Unless carefully identified, use this only for unmistakable eggshells and nests that were used during the Atlas period.
Confirmed	ON	Occupied nest indicated by adult entering or leaving nest site in circumstances indicating an occupied nest, including those in high trees, cliffs, cavities, and chimneys where the contents of the nest and incubating or brooding adult cannot be seen.
Confirmed	FL	Recently fledged young or downy young. This includes dependent young only. Be cautious of species that range widely soon after fledging.
Confirmed	FY	Adult bird carrying food for young or feeding recently fledged young. Note: Some adults carry food a long distance or may be engaged in courtship feeding. One of the best signs to look for is the repeated carrying of food in the same direction.
Confirmed	FS	Adult bird seen carrying fecal sac. Many passerine adults keep their nests clean by carrying membranous, white fecal sacs away from the nest.
Confirmed	NE	Nest with eggs.
Confirmed	NY	Nest with young seen or heard.

Appendix E: Guidelines for Owl Surveys

The guidelines for conducting owl surveys are still in development. As soon as they are available they will be incorporated into the handbook and available on the MNBBA website.

Appendix F: Guidelines for Marsh Bird Surveys

Secretive Marsh Bird Survey Tips

The marsh bird surveys can be conducted by block owners themselves but if these owners are not interested or able to run the special surveys, then regional coordinators can recruit or designate one or more other volunteers to conduct them. So, be sure to let your regional coordinator know if you are ready, willing, and able to volunteer to do one or more marsh bird surveys for the Atlas. Importantly, although our goal is to conduct these surveys in every Priority Block in the state, they also can be conducted by willing volunteers in any atlas block in the state.

When you know what block(s) you will be conducting a survey in, the next step is to print a customized block map. You can access a map by following the link to the mapping tool from www.mnbba.org.

Choosing Your Survey Locations

Choose the survey location(s) that looks like it has habitat components preferred by one or more marsh bird species. We want to maximize the chance of detecting marsh birds if they actually do occur in an atlas block, so feel free to choose the very best looking wetlands in your block, as well as the most promising looking points from which to conduct the survey. When you conduct the surveys please either record the GPS coordinates for the survey point locations and record it clearly on the data sheet or mark the survey spot carefully on your block map.

When to Conduct Marsh Bird Surveys

Surveys should be conducted between May 1st and June 15th. Surveys should be done either in the morning or the evening, which is when marsh birds are most detectable. Vocalizations usually peak in the hours surrounding sunrise and sunset. Morning surveys can be conducted anytime in the period from first light (30-45 minutes before sunrise) to 3 hours after sunrise. Evening surveys should be conducted in the period from 3 hours before sunset to dark (30-45 minutes after sunset).

Marshbirds of Special Conservation Interest

The Least Bittern and Yellow Rail are Species of Special Conservation Interest for the Atlas so please try to obtain as exact location as possible for these species, as well as the highest breeding code you can (this may require several visits).

Marshbirds requiring Verification Forms

The King Rail and Black Rail are two species that are rare enough that should you encounter these in the field, and we hope you do, please fill out a Verification Form and let your Regional or Project Coordinator know.

How to Increase Your Chances for a Successful Survey

Take time to familiarize yourself as much as possible with the various vocalizations of all wetland birds likely to be encountered, as well as calls or other vocalizations of non-target species of interest, such as Alder and Willow Flycatcher, Sedge and Marsh Wren, American Woodcock, and Wilson's Snipe. There are many good commercial sources and internet resources for reviewing marsh bird vocalizations.

Appendix F. Continued

Don't Just Listen – Look Too!

Conducting surveys can be tricky. Marsh birds are elusive and quiet most of the time. They are often difficult to see because they usually remain hidden among the dense growing vegetation. Marsh birds often approach a sound or invader in their territory without vocalizing. They may walk a considerable distance before vocalizing. Watch for any movement in or of the vegetation. It is helpful to quietly pivot around to allow observations in all directions. Because marsh birds are quiet much of the time, this requires the successful observer to be patient. Avoid making noises or moving around very much. Patience and persistence are keys to success.

Acceptable Survey Conditions

Marsh bird surveys should be run under satisfactory weather conditions. Avoid rainy, very windy, or very cold (below freezing) conditions. Occasional light drizzle or mist may not affect marsh bird response. However, steady drizzle or fog should be avoided.

SPECIES	HABITAT	CALL DESCRIPTION AND MNEMONIC	
Sora	Likes dense vegetation in a variety of wetlands with some open water		whinny, per-weep, keep
Virginia Rail	Variety of wetlands with emergents interspersed with open water or mudflats	A Metallic kid-ick or a decsending series of quacks (grunt)	grunt, tick-it, kicker (tic-tic-tic-mcgreer)
Least Bittern	Wetlands with dense vegetation and some open water; woody vegetation may be present	Usually four identical soft coos	
American Bittern	Marshes with tall emergent vegetation	A crooking or "pumping" sound oonck-a-tsoonck	pump-er-lunk
Pied-billed Grebe	Deeper wetlands with open water with emergent vegetation	3-part call starting low and increasing in speed and volume	owwhoop, heyena or donkey bray
American Coot	Open water on large marshes or sewage ponds, with areas bordered by emergent vegetation	rough notes puhk-kuh-kuk. or puhk-ut.	
Common Moorhen	Large marshes, open water and sometimes slow moving rivers bordered by emergent vegetation	Varied, often loud, harsh calls	wipeout, giddyup, beep
Wilson's Snipe	Marshes, ponds, wet meadows, or flooded fields	A winnowing noise or a low, rasping kzrrt	
Yellow Rail	Wet meadows, sedges	Sounds like two pebbles clacking together	click-click-click
King Rail	Marshes with large expanses of emergent vegetation.	Musical ticks-: chac-chac. And kik-kik-kik	
Black Rail	Wet meadows and edges of marshes	kickee-doo, grr-grr-grr	kickee-doo, grr-grr-grr

Appendix G: Species of Conservation Interest

Note: Only for observations of these species that are a “confirmed” evidence of breeding, include the habitat code (on the back of the reference card, Appendix P) that describes the landscape where the bird was observed. Enter the habitat code in the notes column for that species.

Trumpeter Swan	American Woodcock	Tufted Titmouse
American Black Duck	Great Gray Owl	Golden-winged Warbler
Northern Pintail	Short-eared Owl	Tennessee Warbler
Canvasback	Boreal Owl	Black-throated Blue Warbler
Spruce Grouse	Common Nighthawk	Bay-breasted Warbler
Sharp-tailed Grouse	Whip-poor-will	Cerulean Warbler
Greater Prairie-Chicken	Chimney Swift	Prothonotary Warbler
Least Bittern	Red-headed Woodpecker	Connecticut Warbler
Bald Eagle	American Three-toed Woodpecker	Hooded Warbler
Northern Goshawk	Black-backed Woodpecker	Wilson’s Warbler
Red-shouldered Hawk	Olive-sided Flycatcher	Canada Warbler
Swainson’s Hawk	Acadian Flycatcher	Lark Sparrow
Peregrine Falcon	Western Kingbird	Grasshopper Sparrow
Yellow Rail	Bell’s Vireo	Le Conte’s Sparrow
Common Moorhen	Philadelphia Vireo	Evening Grosbeak
Upland Sandpiper	Purple Martin	
Marbled Godwit	Boreal Chickadee	

Appendix H: Colonial Waterbird Species

Note: For these species surveyors need to estimate the number of nests and/or adults and record the colony location. Colonial waterbird species that are very rare, such as the Snowy Egret and Common Tern, are not included on this list because they will require completion of a verification form (see Appendix I and Appendix Q).

Red-necked Grebe

Eared Grebe

Western Grebe

American White Pelican

Double-crested Cormorant

Great Blue Heron

Great Egret

Green Heron

Black-crowned Night Heron

Franklin's Gull

Ring-billed Gull

Herring Gull

Black Tern

Forster's Tern

Appendix I: Species to Verify

Note: Document detailed notes and the location for each sighting of species on this Reporting Type list. For these species completion of a Verification Form and location are required.

Mute Swan	Western Wood Pewee
Northern Bobwhite	Loggerhead Shrike
Horned Grebe	White-eyed Vireo
Clark's Grebe	Rock Wren
Snowy Egret	Carolina Wren
Little Blue Heron	Mountain Bluebird
Cattle Egret	Northern Mockingbird
Yellow-crowned Night Heron	Sprague's Pipit
King Rail	Yellow-throated Warbler
Snowy Plover	Louisiana Waterthrush
Piping Plover	Kentucky Warbler
American Avocet	Yellow-breasted Chat
Solitary Sandpiper	Summer Tanager
Willet	Lark Bunting
Wilson's Phalarope	Baird's Sparrow
Little Gull	Henslow's Sparrow
Caspian Tern	Nelson's Sharp-tailed Sparrow
Common Tern	Chestnut-collared Longspur
Barn Owl	Rusty Blackbird
Northern Hawk Owl	Red Crossbill
Burrowing Owl	White-winged Crossbill

Appendix J: Suggestions for Surveying an Atlas Block

Once you have decided on a block, download a map and aerial photograph. Delineate blocks of habitat including: different types of forest; different types of agricultural fields such as fallow fields, pastures, row crops and ploughed fields; and different types of wetlands including sedge meadows, cattail marshes, open water, lake bays, riverine habitats, etc. Circle these different habitats with a colored pencil/pen on the map ahead of your visit and any unusual features that stand out such as parks, bridges, farmsteads, cemeteries, grain elevators, coniferous groves, orchards, etc. Plan to check all of these as you drive around your atlas block. A good rule of thumb is to stop every half mile within a similar habitat and listen and observe for several minutes much like a Breeding Bird Survey route. If you continue to find new species in a similar habitat continue birding that habitat until you stop recording new species, then move to another habitat and do the same.

Agricultural areas: these areas range from black earth "deserts", like portions of the intensively-farmed Red River Valley where species totals might not exceed 30 species per block, to diverse habitats that could easily surpass 60-70 species. Road access is usually easy and one should attempt to cover most of the roads within a block. Seek out any woodlot and farmstead and bird these. Remember to ask permission to walk all around the homestead, woodlot, farm buildings (swallows, pigeons, sparrows!), small conifer trees (Chipping Sparrow), large conifers (grackles, Mourning Dove), hedgerows (thrashers, catbirds, Yellow Warbler), old trees (various woodpeckers), etc. House Finches often nest in hanging baskets. Even if permission is denied, you can bird many of these farmsteads from a public road.

Usually it's best to park out of site of the farmhouse if possible to avoid any trespassing or disturbance issues (do not trespass off public roads without permission anywhere in Minnesota unless it is known to be public land). Asking permission is often a ticket to finding out about the locations of furtive species such as owls, raptors, or gray partridge or the location of a hidden marsh over the next hill. Leaving a list of birds recorded on the property for the landowner often builds good relationships and might result in easy future access for a later confirmation should you visit the site again. Although some people will refuse you permission no matter what, most folks are only too happy to let you on their property once they understand the project. Don't be shy about asking! And talk to rural mail carriers too to see if they've spotted any goodies like Gray Partridge or Greater Prairie Chicken.

Although row crops have low avian productivity, one can often pick up Vesper Sparrows and occasional Savanna Sparrows and the very occasional Upland Sandpiper. Alfalfa fields are always worth checking for Bobolinks, occasional Dickcissels, and various sparrows. Fallow fields, meadows, and pastures are key areas for many grassland species from Killdeers to Brewer's Blackbirds. Sedge Wrens, Bobolinks, Dickcissels (southern half of state), and meadowlarks are often in CRP (Conservation Reserve Program) fields of tall planted grass or remnant prairie areas. Many farmsteads will have birdhouses, an often slam dunk for Eastern Bluebirds, House Wrens, House Sparrows, and occasionally Purple Martins. Ploughed fields will likely produce Killdeers, Horned Larks, and Vesper Sparrows. Bridges in farm country will often have a duck or two, even on channelized streams and associated Cliff Swallows, Barn Swallows, or the less common Northern Rough-winged Swallows. More wooded areas with bridges will produce Eastern Phoebe.

Cottonwood-lined streams and rivers in farm country can be very productive with cuckoos, raptors, orioles, and various woodpeckers all possible. There are sometimes two types of shelterbelts, claimbelts which mark the original homestead with larger and often dying cottonwoods and other large trees and more modern shelterbelts with a variety of scrub bushes, cedar and other coniferous trees, and a variety of hardwoods. It's not unusual to find 5-15 species in these belts on a single farm. The older claimbelts may have higher diversity and often harbor various woodpeckers, White-breasted Nuthatches, Tree Swallows, and even raptors such as American Kestrels.

Urban areas: many urban areas can produce species lists in the 30-50 species range. Check the more industrialized areas for the trio of introduced species such as Rock Pigeons, European Starlings, and House Sparrows. Check downtowns in small towns for Chimney Swifts and in the late evening for Common Nighthawks. Always check the vicinity of grain elevators for a trio of doves including the introduced but still local Eurasian Collared Dove. Driving urban streets will produce a variety of common species. Be sure to check out older home and yards with older mature trees, visible birdhouses, and any active feeders. Check any park on your map, especially ones that might have a lake or a river running through it. Urban lakes often have more birdlife that one would initially expect. Various swallows forage over the water, kingfishers and Spotted Sandpipers may utilize the docks or shoreline, Green Herons and Great Blue Herons and various ducks and even loons may forage in quiet bays and backwaters. Be sure to bird such areas very early in the morning, preferably on a weekday, when boating disturbance is at a minimum.

Wetlands: many wetlands have a variety of microhabitats best visited by canoe or boat. If you have this capability be sure to check out a public access site ahead of survey work to ease your birding efforts. Many medium to-large lakes in the state have public access sites where one can leave a car and launch at the very least a canoe or small motorcraft. Seek out marshes and wetlands with flowing streams and a variety of open water and channels for best results. Such marshes usually contain a higher diversity than pure stands of cattail with no open water. Check the higher grassy edges of marshes too for breeding shorebirds and waterfowl. Some species like Black Terns and Eared Grebes will breed on floating mats of vegetation so carefully scope any clumps of vegetation in floating mats which might indicate a bird nest. Species like Red-necked Grebes often hunker down low to the water and only the sharp-eyed will spots these species sitting on active nests.

Specialized wetlands like bogs and quarries are often gold-mines for breeding birds. Belted Kingfishers and Bank Swallows may utilize the side of the quarries for their hole nests while the often marshy floor of such sites may harbor both Killdeers and Spotted Sandpipers. Sedge meadows, a common habitat in the northern half of the state, can appear relatively birdless during midday but locally some of Minnesota's most sought after birds like Yellow Rail and Le Conte's Sparrow will make themselves known come early evening or after sundown. Don't ignore sewage ponds wherever you are. Swallows, waterfowl, grebes, phalaropes, and many other species and families will inhabit these often treasure-troves for birding. Access to these ponds may be a problem. Request permission and if denied, try to at least see what you can see from a nearby rise or hilltop or road edge.

Managed wetlands present various challenges for birders. Some may be seasonally flooded or dry and perfect a few weeks or even a year later. Ask wildlife area managers for information on drawdowns, floodings, or even burnings which may create specialized habitat conditions and attract some rare species.

Bogs: in southern and central Minnesota tamarack and cedar bogs often harbor species far south of their normal breeding range. Northern bogs are more difficult places to work. Special caution is necessary if surveying these areas. Some people may find it easier to strap on snowshoes (bear paw-type is best) for easier walking ability in situations where the bog may be too spongy or wet to walk in without some type of assistance. Be sure to scan carefully the low vegetation and tamarack or spruce tree tips along the open bog edge for Olive-sided Flycatchers, Palm Warblers, Merlins, and northern finches in northern Minnesota.

Forested Areas: likely to prove the most diverse of any Minnesota breeding bird habitats, forests in Minnesota run a gamut from 100-foot tall bottomland cottonwoods to scraggly-scrub locust and aspen growing out of rock or cliffsides. If you have a block with heavy forest cover try to delineate different patterns of forest cover on the aerial photographs and then field check them to see if there is a qualitative difference on the ground. Often different age structures of the same forest species will produce different arrays of birdlife. Seasonality can affect this too. Scrubby, dense aspen groves that harbor only a few species in early June as breeding species may harbor foraging young of many more species later in the summer so be sure to recheck such areas. If your block has a variety of topography be sure to check different elevations of forest such as bottomland, mesic, and dry upland sites as well as any forested edges to lakes and wetlands and isolated groves of trees which raptors often favor. Small rocky streams can harbor Louisiana Waterthrush in eastern and southeastern Minnesota along with possible Acadian Flycatchers where canopy coverage is high. Many forested blocks in the transition zone in north central or northeastern Minnesota may harbor 80 or more species. Don't ignore wetlands and ponds in these forests which often have breeding mergansers, rails, Ring-necked Ducks, or Common Goldeneyes present. If you are fortunate to have a block with state or federal lands, be sure to walk a distance offroad where road noise is less and the chances for some breeding species much higher.

Late season tricks: after the breeding season it is still possible to confirm species as breeding by finding old, used nests. One of the easiest to confirm is the hanging basket of the Baltimore Oriole which will often last until well into the winter. Eagle and osprey nests are most obvious when the leaves are off the trees. If you are unsure which species of raptor made the nest GPS the location and return the following year or ask a nearby resident if they know what lives there. Cliff Swallows and Barn Swallows have distinct nests that readily persist over the winter if sheltered under bridges and viaducts. Learn their shapes for an easy confirmation.

Cautionary note: Take care not to disturb bird nests when confirming species identification. Take a quick look to confirm a nest (e.g. raise the top on a bird house or flush an adult off a nest to clinch the species) and then be out of there quickly and get on to the next site. Try not to create a predator path to a breeding ground-nesting bird by stomping down the protective vegetation. Observe nests at a distance with a scope. Patience will pay off most of the time. If you come across a colonial nesting species such as a heronry or pelican colony, observe from a distance. A second visit will often result in visible large young making it easy to confirm such species.

How much time to spend in a block? For most blocks in agricultural landscapes three site visits totaling 12-15 hours should suffice although the more diverse landscapes may require as many as 4-5 visits and 30+ hours. Depending on the diversity of habitat and the

results of repeated visits to the same habitat type, the number of visits should not need to be more than 3-4 spread out over the spring and summer season with a total of 15-20 hours, more if additional species are continuing to be found. Observers may wish to return to the block in a later year but many birders travelling to distant blocks may only be able to spend 1-2 visits at a block. Depending on the birder's skills, a single visit may still produce a very decent "present" or "probable" list that hopefully can be revisited at a later time to raise the confirmation total.

If you live in a priority or even a non-Priority Block you have the luxury of having 5 years to cover the block thoroughly and such coverage may reach 90% + of the expected species with a high confirmation percentage. Studies have shown it is virtually impossible to find 100% of all of the species present. Different observers have different talents in finding certain rare species and some species such as Long-eared Owl and Common Nighthawk are very hard to confirm in some habitats. A block showing 75% or more of the expected species can be considered a completed block and observers should move onto a new Priority Block to help complete the atlas project. Observers living in a non-Priority Block are encouraged to cover their home block but to also adopt a nearby Priority Block as well to make a larger contribution to the project. Don't forget to consider covering a block when on vacation at your summer cabin or at a northern Minnesota vacation site. Boundary Water Canoe Area canoeists will be especially welcome to cover remote sites in the Superior National Forest.

Appendix K: Permission Letter to Survey on Private Property

Dear Minnesota Landowner:

The purpose of this letter is to request permission to watch birds on your property on one or a few occasions in order to make a list of the species that nest there. Observations of birds on your property may add additional species to the Minnesota Breeding Bird Atlas block (a 3x3 sq. mi. region) which I have been assigned. This Atlas is being conducted by hundreds of volunteer bird watchers in the state from 2009-2013. At the end of these five years, volunteers will have finished gathering data for all 2352 Atlas blocks in the state, and a book with information and maps showing the distributions of the 225 or so species of nesting birds in Minnesota will be published.

The reason that I am requesting permission to spend some time watching birds on your property is because you may have one or more habitats here that attract bird species that I have not yet recorded in my Atlas block. In order for the Atlas to give the most accurate data about what bird species occur in what blocks across the state, volunteers are encouraged to try to visit as many of the habitats present in each of their blocks as possible.

In watching birds on your property, I will assume full responsibility for my own welfare, and I will be careful to not disturb you or your property. I will try not to leave any evidence of my visit, unless you would like me to give you a list of the birds that I do observe while I'm here.

In addition, I would be grateful to receive any information that you may have about nesting birds on your property anytime during the five years of the Atlas project. In fact, you can become an Atlas volunteer yourself by following instructions on the project's website (www.mnbba.org). Volunteers not only include people who are assigned one or more whole blocks to cover thoroughly, but also people who want to help by contributing observations of just a few nesting birds from their own backyards.

If you have any questions at all, please feel free to contact me, Name phone number(s),
Mailing address Email address

Or the Regional Coordinator responsible for assigning all of the blocks in this portion of the state, Name phone number(s) Mailing address Email address

For your convenience, I've enclosed a stamped, self-addressed postcard for your reply.

Thank you very much for considering my request.

Sincerely,

Appendix L: Further Considerations about Atlasing and Land Ownership

From north to south, east to west, Minnesota is an extremely diverse state with a wide array of land ownerships. In the southern region and along the Red River Valley, the majority of land is privately owned. As you move north there is considerably more public land, including lands owned by counties, the state, and the federal government. As soon as you begin to survey off-road it is very important that you know who owns the property and that you secure permission to enter. Minnesota's Trespass Laws (M.S. 97B.001 and M.S. 609.605; www.mnbba.org) make it clear that it is unlawful to: 1) enter any agricultural lands, even if they are not posted, for outdoor recreation (M.S. 97B.001, Subd.1a); and 2) trespass on the premises of someone else's land and refuse to depart (M.S. 609.605 Subd.1b(3)).

Given the importance of understanding land ownership boundaries, when you explore the block in spring and/or fall it is a good time to identify private landowners and secure permission to survey their property. Minnesota County Plat Books are particularly helpful in identifying property boundaries and landowners, and are available for purchase in county offices. Plat maps are also available online for many counties and some counties have advanced interactive mapping tools that you may find helpful. Your Regional Coordinator should have a set of the county plat books for all counties in their region. Once you have identified the landowner of a property you wish to survey, and he/she is available, don't be shy about asking permission. If the landowner is not available, you can send a letter requesting permission. Appendix K is a copy of a standard request for permission. It is also available from the MNBBA website.

Finally, throughout the state, and particularly in the northern region, surveyors will encounter public lands in their blocks. They may be owned by the county, the state or the federal government. Although access to most of these lands is not restricted, obey all restrictions that are posted on boundary signs. In all cases, it is best to check with the local public lands office (e.g. a local Department of Natural Resources Offices, a county lands office or a national forest, national park or U.S. Fish and Wildlife office) and let them know what you are doing. Like the private land owners, the public land owners likely will be very interested in learning what you have documented on their property and can often provide you with helpful information.

Appendix M: Notes on Breeding Information for Bird Species Groups

Ducks, Geese, and Swans

Non-breeders are frequently seen south of their known breeding range during summer, particularly on sewage treatment ponds. Lesser Scaup are the most frequent diving duck to summer over without evidence of breeding but almost all species can occur. Breeding by injured northern waterfowl such as Snow Geese has also rarely occurred in the Midwest. Ruddy Ducks are notoriously late breeders with eggs in July and August; early summer records may not be indicative of breeding. Re-nests occur with many species and flightless young can occur even into August and September. Note: Feral Mute Swans have been known to breed in the wild.

Loons

Occasional non-breeders are observed south of the known breeding range in summer. Birds often give flight calls from high overhead. Such flight calls are sufficient only as "Observed". Loons may begin to form loose concentrations (social and/or pre-migratory behaviors), typically on larger lakes, as early as mid- to late July.

Grebes

Horned Grebes rarely occur now in Minnesota as breeders with recent records only from the far northwestern counties. Carefully document any reports of this species. Young of both Red-necked Grebe and Western Grebe may climb on the back of a parent for easy confirmation. There have been reports of Clark's Grebe hybrids in the state.

Pelicans

Pelicans are a colonial-nesting species and nesting locations require additional details (see handbook). Non-breeders (or birds feeding/loafing away from nesting colonies) are common on lakes and marshes throughout much of western Minnesota. Observation of multiple individuals, or individual(s) present on multiple days (7+ days apart), is not sufficient to elevate breeding status above "Observed".

Cormorants

Double-crested Cormorants are colonial breeders that appear in both single-species colonies and with other species of herons. Nesting occurs over a long period and some young can be in the nest throughout August. Additional data required for nesting colonies.

Hérons and Bitterns

American Bitterns are non-colonial nesters; use normal guidelines for breeding codes and for colonial-nesting species (see below). In areas of highly favorable habitat Least Bitterns may breed in small loose colonies. Birds disperse to feed far away from nesting colonies; also potential non-breeders. Single or multiple individuals are commonly observed on wetlands throughout Minnesota. Yellow-crowned Night Heron may nest singly, loosely associated with mixed-species heronries. Observation of multiple individuals, or individual(s) present on multiple days (7+ days apart) not sufficient to elevate breeding status above "Observed" for Great Blue Heron, Great Egret, Snowy Egret, Little Blue Heron, Cattle Egret, Black-crowned Night Heron, and Yellow-crowned Night Heron. Most Green Herons nest in small, loose colonies, Some do nest singly however. Observation of bird(s) perched or foraging within safe dates is sufficient for "Possible".

Vultures

Turkey Vultures are difficult to confirm, breeding on cliffs, in caves, abandoned houses, and

in large hollow trees or logs. Daily wandering may bring vultures virtually anywhere in the state but this does not necessarily equate to a local breeding presence.

Hawks and Eagles

Bald Eagles begin nesting in the south in March and in the north in April but there is also migration still going on in the northeast through mid May; actual nests are not difficult to find. Other hawks (except Broad-wings) begin nesting in April and May but they also are still migrating throughout May. Broad-wings are a late migrant and occur as migrants through early June.

Partridge, Grouse and Turkey

Gray Partridge and Ring-necked Pheasant are non-native species that were introduced early in the 20th century to Minnesota; they are now year-round residents in open areas, principally in the southern and western part of the state. Ruffed Grouse and Spruce Grouse are native permanent residents in the forested part of the state, with the latter species confined to coniferous landscapes. Sharp-tailed Grouse and Greater Prairie-chickens are also native year-round residents, although some birds may wander during the winter. Breeding for these two species begins with communal displaying at mating areas, called leks, sometime in April. The Wild Turkey, a native North American bird, was not known to nest in Minnesota until it was widely introduced by the Department of Natural Resources and now occurs as far north as outside Duluth and Crookston; breeding has not yet been established in many northern areas. The Northern Bobwhite once nested in Minnesota, but now all birds that are seen are escapes from game farms or introduced by people.

Falcons

Both Merlins and Peregrines may over-winter in suburbs and cities where they previously nested; actual nesting behavior should be observed rather than multiple observations.

Rails

Use normal guidelines for breeding codes. Yellow Rail presence/activity closely tied to narrow range of water depth in sedge wetlands. Heavy rains may induce calling/breeding activity later in summer (late June or July) at locations where birds were not detected earlier in breeding season. A few Yellow Rail are known to migrate as late as early June in the North.

Cranes and shorebirds

Sandhill Cranes should be on their territories by mid-April in the south and central and early May in the north. Non-breeders are common in some locales so find a pair to achieve at least a probable status. Adult birds forage near the chicks after hatching so watch carefully for small brown balls of feathers nearby to confirm. Killdeer are early breeders and young may be present as early as April some years. Solitary Sandpiper might breed in remote river swamps and marshes anywhere from Aitkin County northward but are very rare as breeders. They may migrate as late as late May and return southward beginning about June 20th so confirmation would require a nest or young and "probable" is not a likely category to use and feel safe about it. Marbled Godwit are noisy and territorial early in the nesting cycle but very quiet and difficult to find during the early nesting period but are easy to get a "probable" once the young are out and the adults are loudly defending them. No breeding Willet has been confirmed in the state since the 1800's but the species breeds close to the border in South Dakota. Some Spotted Sandpipers are polyandrous with one female and two males. Three adults in close proximity would likely indicate a high probability of a current or potential nest. Wilson's Phalarope often occur on sewage treatment ponds in

summer without evidence of breeding but the species does breed on some such ponds so multiple visits might confirm breeding.

Gulls

As noted in the handbook, additional details are required for colony locations of Colonial-nesting species. Birds disperse to feed far away from nesting colonies. Also, non-breeders (or birds feeding/loafing away from nesting colonies) are common on lakes and marshes throughout much of Minnesota. Observation of multiple individuals, or individual(s) present on multiple days (7+ days apart), not sufficient to elevate breeding status above "Observed". Single pairs of Herring Gulls may be found on nests on cliffs along Lake Superior or on rocky islets on inland lakes.

Terns

Common Terns and Caspian Terns (very rare) are colonial breeders usually occurring on islands and are not to be expected away from large lakes and the North Country. Forsters' Tern breed in loose colonies in open marshlands, habitat sometimes shared with Black Terns.

Pigeons and Doves

Rock Doves are a year-round resident and start breeding as early as April. Mourning Doves migrate, although some individuals over-winter, usually at feeders. Eurasian Collared-Dove, which is an introduced species, recently began to colonize Minnesota from the south. Some birds may over-winter, perhaps depending on the weather. Individuals have been seen as far north as Itasca County; they appear to be dispersing birds that have yet to establish a breeding presence. Breeding for Eurasian Collared-Dove has only been confirmed in Minnesota in the Twin Cities and Houston County; however, the species has been observed in many counties in the southwestern quarter of the state and may nest there.

Cuckoos

Use normal guidelines for breeding codes. Care should be taken in differentiating between species based on calls alone. Eastern Chipmunks have a call that is similar to Black-billed Cuckoo, especially heard at a distance. Black-billed Cuckoo often calls at night.

Owls

Resident, non-migratory, owls (Screech, Great Horned, Barred) begin nesting early – Great Horned in January and the other two at least by March. Migrant owls (Long-eared, Short-eared, Saw-whet) may be still migrating into May in the north; therefore, single observations (calling or sight) should be treated with care until later in the season. Saw-whet Owls may begin dispersal in July. Both Great Gray and Boreal Owls are probably year-round residents as well as migratory invaders; therefore, presence is not enough to indicate breeding until later in the season.

Nightjars

Use normal guidelines for breeding codes. Both species vocalize primarily at night. Nighthawks do nest in native (rock outcrops), as well as urban habitats. Common Nighthawks begin congregating and migrating in latter half of July.

Swifts

Chimney Swifts breed in both home and industrial/school chimneys in both small towns and cities; a few pairs still breed in hollow trees, usually in mature forests and perhaps along rivers.

Kingfishers

Kingfishers use burrows for roosting so carrying food into a burrow would be the best way to confirm. Chicks are usually loud when supper arrives.

Woodpeckers

Species that are year-round residents (Red-bellied, Downy, Hairy, Pileated) begin nesting in March in the south and April in the north. Pairing, calling and cavity building provide evidence early in the season, but they are fairly quiet later when on eggs; feeding young in cavities provides good evidence of nesting later in the season. The migrant species (Red-headed, Sapsucker, Flicker) are both migrating and establishing breeding in May. The three-toed woodpeckers (American, Black-backed) are both residents and winter invaders; very little is known about their breeding behavior chronology.

Flycatchers

Use normal guidelines for breeding codes. Several species (particularly Olive-sided and Alder flycatchers) are very late migrants, as late as 10 June in the south. Extreme care should be taken in differentiating between Empidonax flycatchers based on sight alone. There have been reports of Western Wood-Pewee hybrids in the state.

Larks

The Horned Lark is widespread in open areas of the state and is one of the first passerines to breed with nesting suspected as early as March. An early visit to your block in March or April is recommended although the birds sing through June and into early July with second broods a possibility. Finding the camouflaged nest on bare ground is a challenge; better to confirm by finding the recently fledged young that remain with their parents a few days after leaving the nest.

Vireos

Use normal guidelines for breeding codes. Warbling Vireo nests are often high in trees in dense vegetation and difficult to spot. Philadelphia Vireos are likely only in the far north and there are few confirmed nests for the state. Bell's Vireos are rare and breed in shrubbery, thickets, and short trees in the southern third of the state.

Jays and Crows

Use normal guidelines for breeding codes. Most species are early nesters. Black-billed Magpies often form flocks in fall/winter (particularly in far northwestern Minnesota), with some movements outside of breeding areas. Nest-building typically begins in mid- to late April. Common Ravens occasionally move well south of normal breeding range in winter. Observations of birds south of primary breeding range during April-May should be approached with caution (follow-up later in breeding season); may nest in cliffs or trees. Common Ravens may utilize nests from previous years of other species including crows and raptors.

Chickadees and Titmice

The Black-capped Chickadee is an easily confirmed hole-nesting species that also occasionally utilizes bird houses. Nesting may commence in April, more likely in May and second broods are known to occur at this latitude in June and July. The Boreal Chickadee is a very locally occurring species, difficult to confirm with breeding initiated in mid-to late spring when observers may not be in their North Country environment. Search for this species in coniferous bogs and adjacent mixed forest habitat from Aitkin County northward. The Tufted Titmouse favors mature forests in southeastern Minnesota uncommonly as far west as Rochester and rarely, nowadays, as far north as the Twin Cities. The titmouse breeds in cavities and occasionally in nest boxes in mid-to late spring and is normally

single-brooded. Fledged young remain with their parents for several weeks in a localized situation which should indicate a “confirmed” breeding unless you are near the boundary of a block when it might indicate only a “probable.”

Swallows

Tree Swallows are easy to confirm when they utilize bird houses. If you can, try to obtain specific addresses for Purple Martin colonies for the Minnesota Purple Martin project. Migrant martins in late July and early August will utilize martin houses in migration so try to confirm before 20th of July or find flightless young/eggs. Northern Rough-winged Swallows breed under bridges but occasionally a few will breed in large Bank Swallow colonies where it would be difficult to confirm. Cliff Swallow nests under bridges usually last about a year so the species could be confirmed post-breeding if the nests are distinguished from bridge-nesting Northern Rough-winged Swallows and Barn Swallows.

Creepers

Brown Creepers place their nests under loose bark and are difficult to confirm when incubating. Easier to confirm when young are being fed or when fledged.

Nuthatches

Both species are considered year-round residents, but wintering birds may have dispersed from other areas. Because the chronology of these movements is not known, observations alone in early spring may not indicate breeding. Red-breasted Nuthatches do have population cycles and are found wintering in southern locations and may not leave until late May.

Wrens

Use normal guidelines for breeding codes. Winter Wrens appear to breed in very limited numbers in southern Minnesota, particularly in the southeastern bluffs and Minnesota River Valley. Individuals of this species seen/heard in this region in mid- to late May warrant follow-up visits to determine breeding status. Sedge and Marsh Wrens typically build “dummy” nests. Nests found without further breeding evidence (e.g., birds carrying food into nest) for these two species results in “Probable”, not “Confirmed” breeding status.

Bluebirds

Mountain Bluebirds paired with Eastern Bluebirds have been documented a few times, with the two most recent records from far northwestern Minnesota. Bluebirds typically nest in human-built nest boxes. Nesting in natural cavities should be noted.

Kinglets

Both species nest only in northern Minnesota. All observations in the south in late May or early June are undoubtedly migrants. In the north, use normal guidelines for breeding codes.

Gnatcatchers

Nest-building for the Blue-gray Gnatcatcher commences as early as early May in southeastern Minnesota. Try to confirm this species before the trees fully leaf out and look for a small knob on an outer (usually) branch.

Mockingbirds and Thrashers

The widespread Gray Catbird prefers edge habitats, scrublands, shelterbelts, and woodlots in both rural and urban situations. Catbirds may raise two broods so confirmation is possible from May through August. The Northern Mockingbird is a sparse breeding species potentially occurring in almost any part of the state outside the most heavily-forested regions. Their breeding season is long, extending from April to August. The nest is usually

placed in a small spruce tree, hawthorn, crab, or other ornamental in urban/suburban and agricultural landscapes. The Brown Thrasher is possible throughout the entire state but more localized in the heavily forested north and northeast. The species breeds from April to August with second broods providing a chance to confirm throughout late summer. Favored habitats include shrub/scrub, pastures with scattered shrubs, hedgerows, woodlots, and forest edges.

Thrushes

Use normal guidelines for breeding codes.

Hermit Thrushes primarily nest in lowland coniferous forests, but sometimes are found in mature, moist deciduous forest. Wood Thrushes sing most actively at dawn and dusk. Song activity is often greatly reduced relatively early in the morning, with activity increasing again at dusk.

Pipits

Use normal guidelines for breeding codes. Sprague's Pipit is now only a casual breeder in Minnesota. Males deliver song while in flight very high overhead, such that a singing bird is often not visible. Singing males could be unpaired individuals.

Waxwings

The bulk of the breeding for Cedar Waxwing likely doesn't occur until well after mid-June when fruits become available. Neighboring states and provinces have found some birds breeding as late as September. Foraging birds may occur a considerable distance from the nest site so use caution in indicating "possible" and "probable" for the breeding codes.

Shrikes

Although the Northern Shrike breeds no closer than northern Ontario, individual birds are known to sing in Minnesota from late winter into early May. Such activity should not be misconstrued as a sign of breeding. A high degree of caution in identifying shrikes seen before mid-May is thus needed. Loggerhead Shrikes are scarce, very local residents in some of the lightly-forested or non-forested regions of the state. They are early migrants and prefer native grasslands, early successional shrub-scrub habitat, and unimproved pasture, often placing their nests in small, densely-vegetated trees such as wild plum, various crabs and hawthorns, locusts, serviceberry, and red cedar. Two broods may be produced in a year with the first nest built in late April or early May.

Wood-Warblers

A few species can be found in forested regions throughout most of the state: Yellow, American Redstart, Ovenbird, and Common Yellowthroat. Several nest only in the southern half of the state: Blue-winged, Cerulean, Prothonotary, Louisiana Waterthrush, and Hooded. Others nest almost entirely in the north so observations further south need to be well documented to separate migrants from possible breeding birds with the safe dates used as guides. Late migrants, like Tennessee, Connecticut, Mourning, Wilson's and Canada, may linger into mid-June with some singing individuals observed that are not on breeding territory. Fall migration can begin in July for species that have failed to successfully breed; sporadic singing may occur then as well. In the southeastern quarter of Minnesota there are a number of breeding records for species that almost entirely nest in the north – Golden-winged, Nashville, Chestnut-sided, Black and White, Mourning and Canada. These species require good documentation to make sure they are not migrants or vagrants. With one exception (Louisiana Waterthrush) no warbler species has been studied in Minnesota for its breeding chronology.

The Louisiana Waterthrush is an early breeding species and birds may begin incubating eggs by mid-May; male singing activity begins in late April, peaks in early to mid-May, and is much reduced by early June.

Blackbirds/Orioles

In general, use normal guidelines for breeding codes. Observers should be careful in identifying non-vocalizing meadowlarks, particularly since there is extensive overlap in the breeding ranges of both species in Minnesota. Nesting Rusty Blackbirds were documented in extreme northeastern Minnesota in the early 1980's, but none have been found breeding since then. This species may still breed regularly in remote areas, particularly along rivers and streams in the Boundary Waters Canoe Area Wilderness. Any breeding records of Rusty Blackbird should be well-documented. Great-tailed Grackles are uncommon to rare breeders southwest of the Minnesota River, with the bulk of the breeding population in Jackson and adjoining counties. In Minnesota, this species nests in cattail marshes, and can be quite secretive during the breeding season.

Tanagers

Use normal guidelines for breeding codes. Summer Tanager is very rare in summer in southern Minnesota. Male Summer Tanagers paired with female Scarlet Tanagers have been documented nesting in the southern Twin Cities metropolitan area in recent years. Also, there have been recent June sightings of singing male Summer Tanagers in Lincoln and Jackson counties in the Southwest. Observers should give high priority to documenting elevated breeding status (Probable or Confirmed) for this species, if encountered. There have been reports of Summer Tanager hybrids in the state.

Finches

Purple Finch would not be expected to breed further south than St. Cloud and Princeton. Nests south of there should be well-documented. House Finch often place their nests in hanging baskets, an easy confirmation. The Pine Grosbeak is a rare but potential breeder in the far northern part of the state but would be very difficult to confirm. Crossbills are erratic breeders and although they breed primarily in the coniferous northlands, some, mainly Red Crossbills, may breed well to the south in coniferous plantings. At similar latitudes in Ontario, Red Crossbills breed mainly in late summer and fall and in late winter in response to maturing cone crops. The presence of streaky juveniles does not imply local breeding as the young retain this plumage for a prolonged period. Pine Siskins may breed from February through July; listen for the rising buzzy trills in open coniferous or mixed forest or coniferous plantations. Evening Grosbeak are also difficult to confirm, breeding in dense foliage in the upper reaches of trees, and are to be expected only in the northern third of the state.

Sparrows and Longspurs

Lark Bunting and Baird's Sparrow formerly nested in Minnesota but now occur only as accidental breeders. Both species should be watched for in far western Minnesota, and any occurrences should be well-documented. Henslow's Sparrow may nest in small, loose colonies. Chestnut-collared Longspur is known to nest primarily in the Felton area, Clay County. However, small colonies of this species have been found recently in Polk and Pipestone counties, so observers should watch for breeding longspurs throughout far western Minnesota.

Appendix N: Field Card
See next two pages

Appendix O: MNBBA Reference Card
(See following two pages)

MNBB Reference Card: Master List of Species and Reporting Categories

SPECIES	SC I	CW	V	SPECIES	SCI	CW	V	SPECIES	SCI	CW	V	SPECIES	SCI	CW	V	SPECIES	SCI	CW	V
Canada Goose				Broad-winged Hawk				Downy Woodpecker				Hermit Thrush				Lincoln's Sparrow			
Mute Swan			X	Swainson's Hawk	X			Hairy Woodpecker				Wood Thrush				Swamp Sparrow			
Trumpeter Swan	X			Red-tailed Hawk				American Three-toed Woodpecker	X			American Robin				White-throated Sparrow			
Wood Duck				American Kestrel				Black-backed Woodpecker	X			Gray Catbird				Dark-eyed Junco			
Gadwall				Merlin				Northern Flicker				Northern Mockingbird			X	Chestnut-collared Longspur			X
American Wigeon				Peregrine Falcon	X			Pileated Woodpecker				Brown Thrasher				Northern Cardinal			
American Black Duck	X			Yellow Rail	X			Olive-sided Flycatcher	X			European Starling				Rose-breasted Grosbeak			
Mallard				King Rail			X	Western Wood-Pewee			X	Sprague's Pipit			X	Blue Grosbeak			
Blue-winged Teal				Virginia Rail				Eastern Wood-Pewee				Cedar Waxwing				Indigo Bunting			
Northern Shoveler				Sora				Yellow-bellied Flycatcher				Blue-winged Warbler				Dickcissel			
Northern Pintail	X			Common Moorhen	X			Acadian Flycatcher	X			Golden-winged Warbler	X			Bobolink			
Green-winged Teal				American Coot				Alder Flycatcher				Tennessee Warbler	X			Red-winged Blackbird			
Canvasback	X			Sandhill Crane				Willow Flycatcher				Nashville Warbler				Eastern Meadowlark			
Redhead				Snowy Plover			X	Least Flycatcher				Northern Parula				Western Meadowlark			
Ring-necked Duck				Piping Plover			X	Eastern Phoebe				Yellow Warbler				Yellow-headed Blackbird			
Lesser Scaup				Killdeer				Great Crested Flycatcher				Chestnut-sided Warbler				Rusty Blackbird			X
Bufflehead				American Avocet			X	Western Kingbird	X			Magnolia Warbler				Brewer's Blackbird			
Common Goldeneye				Spotted Sandpiper				Eastern Kingbird				Cape May Warbler				Common Grackle			
Hooded Merganser				Solitary Sandpiper			X	Loggerhead Shrike			X	Black-throated Blue Warbler	X			Great-tailed Grackle			
Common Merganser				Willet			X	White-eyed Vireo			X	Yellow-rumped Warbler				Brown-headed Cowbird			
Red-breasted Merganser				Upland Sandpiper	X			Bell's Vireo	X			Black-throated Green Warbler				Orchard Oriole			
Ruddy Duck				Marbled Godwit	X			Yellow-throated Vireo				Blackburnian Warbler				Baltimore Oriole			
Gray Partridge				Wilson's Snipe				Blue-headed Vireo				Yellow-throated Warbler			X	Purple Finch			
Ring-necked Pheasant				American Woodcock	X			Warbling Vireo				Pine Warbler				House Finch			
Ruffed Grouse				Wilson's Phalarope			X	Philadelphia Vireo	X			Palm Warbler				Red Crossbill			X
Spruce Grouse	X			Little Gull			X	Red-eyed Vireo				Bay-breasted Warbler	X			White-winged Crossbill			X
Sharp-tailed Grouse	X			Franklin's Gull		X		Gray Jay				Cerulean Warbler	X			Pine Siskin			
Greater Prairie-Chicken	X			Ring-billed Gull		X		Blue Jay				Black-and-White Warbler				American Goldfinch			
Wild Turkey				Herring Gull		X		Black-billed Magpie				American Redstart				Evening Grosbeak	X		
Northern Bobwhite			X	Caspian Tern			X	American Crow				Prothonotary Warbler	X			House Sparrow			
Common Loon				Black Tern		X		Common Raven				Ovenbird							
Pied-billed Grebe				Common Tern			X	Horned Lark				Northern Waterthrush							
Horned Grebe			X	Forster's Tern		X		Purple Martin	X			Louisiana Waterthrush							
Red-necked Grebe		X		Rock Pigeon				Tree Swallow				Kentucky Warbler			X				
Eared Grebe		X		Eurasian Collared-Dove				Northern Rough-winged Swallow				Connecticut Warbler	X						
Western Grebe		X		Mourning Dove				Bank Swallow				Mourning Warbler							
Clark's Grebe			X	Yellow-billed Cuckoo				Cliff Swallow				Common Yellowthroat							
American White Pelican		X		Black-billed Cuckoo				Barn Swallow				Hooded Warbler	X						
Double-crested Cormorant		X		Barn Owl			X	Black-capped Chickadee				Wilson's Warbler	X						
American Bittern				Eastern Screech Owl				Boreal Chickadee	X			Canada Warbler	X						
Least Bittern	X			Great Horned Owl				Tufted Titmouse	X			Yellow-breasted Chat				X			
Great Blue Heron		X		Northern Hawk Owl			X	Red-breasted Nuthatch				Summer Tanager			X				
Great Egret		X		Burrowing Owl			X	White-breasted Nuthatch				Scarlet Tanager							
Snowy Egret			X	Barred Owl				Brown Creeper				Eastern Towhee							
Little Blue Heron			X	Great Gray Owl	X			Rock Wren			X	Chipping Sparrow							
Cattle Egret			X	Long-eared Owl				Carolina Wren			X	Clay-colored Sparrow							
Green Heron		X		Short-eared Owl	X			House Wren				Field Sparrow							
Black-crowned Night Heron		X		Boreal Owl	X			Winter Wren				Vesper Sparrow							
Yellow-crowned Night Heron			X	Northern Saw-whet Owl				Sedge Wren				Lark Sparrow	X						
Turkey Vulture				Common Nighthawk	X			Marsh Wren				Lark Bunting			X				
Osprey				Whip-poor-will	X			Golden-crowned Kinglet				Savannah Sparrow							
Bald Eagle	X			Chimney Swift	X			Ruby-crowned Kinglet	X			Grasshopper Sparrow	X						
Northern Harrier				Ruby-throated Hummingbird				Blue-gray Gnatcatcher				Baird's Sparrow			X				
Sharp-shinned Hawk				Belted Kingfisher				Eastern Bluebird				Henslow's Sparrow			X				
Cooper's Hawk				Red-headed Woodpecker	X			Mountain Bluebird			X	Le Conte's Sparrow	X						
Northern Goshawk	X			Red-bellied Woodpecker				Veery				Nelson's Sharp-tailed Sparrow			X				
Red-shouldered Hawk	X			Yellow-bellied Sapsucker				Swainson's Thrush				Song Sparrow							

SCI: Species of Conservation Interest: Include the habitat code for species **only** when confirmed evidence of breeding is documented.

Colonial Waterbird Species: Estimate the number of adults and/or nests in the colony and give location.

Verify Species: Completion of a Verification Form is required that includes detailed notes and location information.

MNBBA Habitat Codes

FDX	Forest, Deciduous: deciduous species >90% of tree cover	OWX	Wetland/Water: open or shrubby (native) habitats that are wet or periodically/permanently flooded
FDU	Forest, Deciduous Upland: bur, pin, white & red oak; aspen; paper birch; sugar maple, basswood, hickory, etc.	OWB	Open Bog: ericaceous (lowland evergreen) shrubs; sphagnum
FDL	Forest, Deciduous Lowland: silver maple, green & black ash, river birch, cottonwood, swamp white oak, etc.	OWG	Sedge/Lowland Grass: includes sedges, wet prairie, red-canary
FCX	Forest, Coniferous: coniferous species >75% of tree cover	OWS	Shrub Swamp: willow, dogwood, alder, etc. (shrub cover >25%)
FCU	Forest, Coniferous Upland: pines, spruce-fir and upland white cedar	OWM	Emergent Marsh: cattails and/or bulrushes/phragmites dominant
FCL	Forest, Coniferous Lowland: tamarack, black spruce, and lowland white cedar, includes "stagnant" types with tree cover 50-70%	OWL	Lake: includes water lilies, sparse bulrush/cattail border
FMX	Forest, Mixed Deciduous and Coniferous: Coniferous species 10-75% of tree cover	OWR	River/Stream: minimum width about 5 meters (16 feet)
FMU	Forest, Mixed Upland: mix of upland deciduous and coniferous trees	OPX	Open/Non-Vegetated: native, non-vegetated habitats dominated by exposed rock, sand, mud, etc.
FML	Forest, Mixed Lowland: mix of lowland deciduous and coniferous trees	OPC	Cliff/talus: cliffs and talus slopes
SDX	Semi-Open Deciduous: deciduous species comprise >90% of woody cover	OPR	Rock Outcrop: bedrock outcrops
SDN	Semi-Open w/ Deciduous Upland Natives: oak savanna, aspen parkland; native species dominant	OPS	Shoreline/Beach/Mudflat: lake/river beach (sand, gravel, mud, rock)
SDD	Semi-Open w/Deciduous Upland Disturbed: upland cutover, burned, regenerating, upland shrub, plantation	HUX	Urban/Small Town: urban, suburban and small towns
SDL	Semi-Open w/Deciduous Lowland: lowland cutover, burned, regenerating (native shrub swamps are OWS)	HUC	Commercial/Industrial: offices, shopping centers, warehouses, factories, mostly impervious surfaces
SCX	Semi-Open Coniferous: coniferous species comprise >75% of woody cover	HUR	Residential: city, suburban, or small town residential areas with mix of lawns, trees, driveways, etc.
SCN	Semi-Open w/Coniferous Upland Natives: jack pine savanna, red cedar; native species dominant	HUO	Open Space: includes city/town parks, ball fields, golf courses; dominated by turf grasses, gravel parking areas, etc.
SCD	Semi-Open w/Coniferous Upland Disturbed: cutover, burned, regenerating, upland shrub, plantation	HRX	Rural Upland: rural uplands including farms, rural homes, and surrounding areas
SCL	Semi-Open w/Coniferous Lowland Disturbed: lowland cutover, burned, regenerating (native shrub swamps are OWS)	HRC	Cultivated/Row Crop: cultivated fields, including all row crops, small grains, etc. or recently cultivated fallow fields
SMX	Semi-Open Mixed Deciduous and Coniferous: coniferous species comprise 10-75% of woody cover	HRH	Hay: non-native grasses or alfalfa/legume/clover; has or will probably be harvested
SMN	Semi-Open w/Mixed Deciduous and Coniferous Upland Natives: native species dominant	HRP	Heavily-grazed Pasture: pastures uniformly grazed to maximum height of 1-2 inches (light to moderately grazed pastures are OGN or OGC)
SMD	Semi-Open w/Mixed Deciduous and Coniferous Upland Disturbed: cutover, burned, regenerating, upland shrub, plantation	HRF	Rural Farm/Residential: farmsteads and non-farm homes, including outbuildings, yards and small feedlots
SML	Semi-Open w/Mixed Deciduous and Coniferous Lowland Disturbed: lowland cutover, burned, regenerating	HRT	Trees/Woodlot: orchards, multi-row shelterbelts, farm woodlots (<20 acres); hybrid poplar (planted in multiple, uniform rows)
OGX	Grassland Upland: uplands dominated by herbaceous species, primarily grasses	HRG	Gravel Pit/Quarry/Mine: includes threes and other highly disturbed areas devoid of vegetation
OGN	Grassland Upland Native: includes light-moderately grazed native prairie	HRD	Roadside Ditch/Fenceline: include RR rights-of-way, transportation corridors, and adjoining fencelines & utility lines
OGC	Grassland Upland Non-native: includes light-moderately grazed non-native grass (cool season grasses)	HRM	Mosaic/Fragmented: mosaic or interspersed of multiple (3+) habitats or habitat components; no single habitat > 20 acres
OGP	Grassland Upland Planted Native: homogeneous tall, thick native grasses (usually 1-2 species)	HWX	Rural Wetland: rural, human-created or disturbed wetlands
		HWP	Stock Pond: small ponds within pastures or adjoining farmsteads
		HWS	Sewage (wastewater treatment) Lagoon: includes open water, shoreline and adjoining dikes of lagoons
		HWF	Flooded Field: flooded cultivated or fallow fields

Appendix P: Verification Form

(This form has not yet been finalized; it will be inserted as soon as it is completed.)

Appendix Q: Field Reminder Checklist

- Let someone know where you are going
- Be aware of areas that require special permission
- Get landowner permission
- Pack the appropriate field gear
 - o Field Forms
 - o Pencils
 - o Cell Phone
 - o Block Maps/County Maps
 - o Clipboard
 - o Windshield BBA Placard
 - o Atlas Brochures
 - o Notebook
 - o Field Guide
 - o Appropriate Field Clothing
 - o GPS unit and/or compass
 - o Binoculars
 - o Sunscreen, Hat
 - o Food and Water
 - o Spotting Scope
 - o First Aid Kit
 - o Vehicle Safety Kit
 - o Clock/Wristwatch
 - o Landowner Letters