Marsh Monitoring Program
Participant’s Handbook
For Surveying Marsh Birds
Revised 2008
About This Participant’s Handbook

We want to clearly instruct participants in all aspects of the Marsh Monitoring Program (MMP). Please read this booklet thoroughly and adhere to the protocol carefully. If you have any questions, comments or recommendations, please give us a call at 1-888-448-2473 ext. 124.

Participant information is divided into three booklets: Getting Started, Surveying Amphibians and Surveying Birds. Getting Started provides background about the MMP, describes how routes are assigned/selected, what an MMP station is and how to place them on a route. Getting Started also covers the marsh habitat description protocol. The Amphibian and Marsh Bird survey booklets each contain detailed survey instructions, important tips to conduct a successful survey, and example forms to help you become familiar with each of the MMP survey types.

During your first survey year, you will receive the Getting Started booklet and one or both of the Amphibian and Marsh Bird survey booklets depending on the survey type(s) you have chosen. It is a good idea to review these booklets prior to each survey season to refresh your memory and build confidence.

<table>
<thead>
<tr>
<th>TABLE OF CONTENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MARSH BIRD SURVEYS</td>
</tr>
<tr>
<td>When Should I Conduct My Surveys?</td>
</tr>
<tr>
<td>Conducting the Survey</td>
</tr>
<tr>
<td>Getting Started</td>
</tr>
<tr>
<td>Marsh Monitoring Program - Bird Survey Form</td>
</tr>
<tr>
<td>Marsh Bird Mapping Symbols</td>
</tr>
<tr>
<td>Returning your data to Bird Studies Canada</td>
</tr>
<tr>
<td>SAMPLE SURVEY</td>
</tr>
<tr>
<td>APPENDIX 1: Safety First!</td>
</tr>
<tr>
<td>APPENDIX 2: Tips For Filling In Scannable Forms</td>
</tr>
<tr>
<td>APPENDIX 3: Background Noise Codes</td>
</tr>
<tr>
<td>APPENDIX 4: Beaufort Wind Scale</td>
</tr>
<tr>
<td>SPRING REFRESHER</td>
</tr>
</tbody>
</table>

Front cover: American Bittern by Tara Crewe

MARSH BIRD SURVEYS

Human activity in the densely-populated Great Lakes basin has resulted in the degradation and loss of many wetlands, particularly marsh complexes. This decline in marsh habitat has resulted in the population decline of many marsh-dependent bird species. Among these are a group of “focal” marsh bird species that rely on marshes as breeding habitat, and whose presence is recognized as an important indicator of marsh health. Long-term monitoring of marsh bird presence and abundance is thus an effective means to estimate and track the ecological integrity of marshes. Marsh bird monitoring data collected by Marsh Monitoring Program (MMP) participants contribute toward wetland conservation and management initiatives at a variety of spatial scales across the Great Lakes basin.

You don't need to be an ace-birder to conduct the marsh bird survey. On the other hand, the survey is not suitable for novices. As a general guideline, participants should be able to correctly identify at least 50 species of common birds, by sight and sound, especially those living in and around marshes. The Training CD will serve as a useful memory refresher and to fine-tune your skills, but it alone will not be sufficient to learn all that's required.

The Marsh Monitoring Program (MMP) marsh bird survey instructions have been revised to align with North American marsh bird monitoring standards. Both new and returning participants should read and follow these instructions carefully and listen to the Training CD prior to conducting their first survey visits.

When Should I Conduct My Surveys?

- Marsh bird routes are surveyed **two times** each year between May 20 and July 5. Surveys must be conducted at least **10 days apart**.

- Survey time (morning or evening) is determined at the time of route creation and must remain the same for that route for both visits and all subsequent years of surveying. Differences in bird activity during morning and evening require that data from a survey be collected consistently during the same period of the day. As such, evening routes **must remain** evening routes, and morning routes **must remain** morning routes.

- Morning surveys can **begin 30 minutes before sunrise and end no later than 10:00 h**. Evening surveys can **begin no earlier than four hours before sunset and must be completed by dark**. The “clock time” for sunrise and sunset is dependent on both the survey date and route location (i.e., latitude). Check your local weather station for this information. For each visit, a route must be surveyed in its entirety and in the same station order.

- **Each station is surveyed for 15 minutes**. A typical route of four stations may take up to two hours to survey. Survey period length will also vary depending on the distance between stations and site accessibility. It is a good idea to “test” how long it will take you to travel between your station focal points.

- Surveys should be undertaken in weather that is favourable for surveying birds: **good visibility, warm temperatures (at least 16°C or 60°F), no precipitation and little or no wind**. If the weather does not meet these guidelines or if during your survey conditions cease to meet these guidelines, you should cancel the survey and re-do it later.
Marsh Bird Surveys

- Strong wind not only suppresses bird-calling activity, it also reduces your ability to hear and distinguish bird calls. To reduce the influence of wind on survey accuracy we require that surveys be conducted when the wind strength is Code 0, 1, 2 or 3 on the Beaufort Wind Scale (see Appendix 4). If the wind is strong enough to raise dust or loose paper and move small tree branches, wait for calmer weather.

- All but the lightest drizzle suppresses bird activity and interferes with your ability to hear, not to mention soaking you and your forms, and generally making you miserable! We want you to find these surveys interesting and pleasant, not a burden. Pick a nice morning or evening!

Conducting the Survey

Getting Started

Field Checklist

It's best to be prepared! Below is a list of items you will require for each field visit and a selection of recommended items you may find useful. Feel free to supplement this list with other items you feel you might need.

<table>
<thead>
<tr>
<th>Required Items:</th>
<th>Recommended Items:</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMP Bird Survey Form(s)</td>
<td>GPS unit</td>
</tr>
<tr>
<td>Pens or pencils (bring a back-up)</td>
<td>Cell phone</td>
</tr>
<tr>
<td>Watch</td>
<td>Compass or map</td>
</tr>
<tr>
<td>Clipboard (or something else hard to write on)</td>
<td>Bird field identification guide</td>
</tr>
<tr>
<td>Broadcast unit (e.g., portable CD player with speakers and fresh batteries)</td>
<td>Thermometer</td>
</tr>
<tr>
<td>Marsh Bird Broadcast CD</td>
<td>This instruction booklet</td>
</tr>
<tr>
<td>Binoculars</td>
<td>Flashlight/ headlamp</td>
</tr>
<tr>
<td>Spare batteries</td>
<td>Mosquito repellent</td>
</tr>
<tr>
<td></td>
<td>Water and snacks (Be sure to carry out any garbage!)</td>
</tr>
</tbody>
</table>

You might want to bring an assistant along for company and to share in the experience. This person can help you find your stations, hold your broadcast unit, and document information such as the weather conditions. Your assistant may even be able to take over for you in future years. However, you must find, identify, and count all the birds unaided. More than one observer will bias the results.
Marsh Bird Broadcast CD

Secretive marsh birds can often be coaxed into responding to a recorded broadcast of their call. In order to ensure data are collected for some important but secretive marsh birds, you have been provided with a Broadcast CD that contains a 5-minute sequence of call recordings of the following species: Least Bittern, Sora, Virginia Rail, a combination of Common Moorhen/American Coot, and Pied-billed Grebe. Each species call broadcast is 30 seconds long followed by 30 seconds of silence. The CD player that you use to broadcast the calls must be loud enough to be heard well at a distance of 100 m (110 yards). Many of the small, low-cost CD players (e.g., a “Discman”) can produce enough volume but the speakers must also be capable of attaining the appropriate volume. Many battery-powered speaker sets available are appropriate, but you should test the effective broadcast distance before using the unit in the field. Recruit a friend to help you establish that you can hear the calls at the appropriate distance. If you can't, you should upgrade your equipment. In some jurisdictions, broadcast units (portable CD players and speakers) are available to borrow from partnering organizations and MMP regional coordinators. Also make sure to always carry new spare batteries. Please contact Kathy Jones for further information using the contact information at the end of this booklet.

The 15-minute MMP marsh bird survey is sub-divided into three 5-minute components: a 5-minute passive (silent) observation period, a 5-minute call playback period, and a second 5-minute passive observation period. The MMP Broadcast CD that you are provided has a 15-minute running time with prompts to indicate different components of the survey. When you are ready to begin your survey at a station, press play on your CD player making sure that the volume is at full. A double-tone will mark the start and end of the 15-minute survey. The call of the Least Bittern will mark the start of the 5-minute call broadcast period, while a single-tone will mark the start of the second 5-minute passive period.

Marsh Monitoring Program - Bird Survey Form

The primary objective of this program is to track observations of “focal” marsh bird species. Focal species are those species that rely on marsh habitats for one or more stages of their life cycle. For the purposes of the Marsh Monitoring Program, the focal species are:

- American Bittern (AMBI)
- American Coot (AMCO)
- Black Rail (BLRA)
- Common Moorhen (COMO)
- Least Bittern (LEBI)
- Pied-billed Grebe (PBGR)
- King Rail (KIRA)
- Sora (SORA)
- Virginia Rail (VIRA)
- Yellow Rail (YERA)

Non-focal, or “secondary” species are birds that touch down or are landed within the station area, but are not focal species, and are recorded through this protocol as mapped observations. Aerial foragers, outside observations and fly-throughs of secondary species are also recorded. Aerial foragers are birds that are foraging in flight within your study area for items such as fish, insects or other birds. Outside observations are secondary species that you observe beyond the 100-m (110-yard) survey station area. Fly-throughs are birds that pass through your survey area but do not use it (no touch-down or foraging). Each of these groups is tracked and recorded differently on the MMP Bird Survey Form.

The front of the Bird Survey Form can be visually divided into four sections. The first section consists of site and visit information; the second is the main table used for recording focal species observations. Below the main table, the third section includes all secondary species components: a station map for mapping secondary species, and two small tables for recording aerial foragers and outside/fly-through observations. The fourth section, located at the bottom of the form, is a summary table for secondary species used to condense the information recorded on the Secondary Species Map. This last section can be completed as soon as you finish each station’s survey.
As you become familiar with the MMP survey forms and your route(s) you will develop a system for conducting your survey that works for you. At the beginning of each field season, please read through the following sections explaining how to fill out the Bird Survey Form to ensure that your forms are completed correctly. One form is used for each survey station on your route. Therefore, if your route contains 4 stations, then you will require 8 survey forms to complete both survey visits in a season.

The Bird Survey Form is the only place you will record MMP data for your bird surveys, so it is important that you are familiar with each component of the form. The form has been created as a computer scannable form (see Appendix 2), so please ensure that you write legibly when completing these forms, and that they are in good condition to return to Bird Studies Canada. Below is a brief overview of each form component.

Form errors may prevent us from being able to use your data. Please double-check your forms.

**Recording Site Information**

**Before starting the survey**, fill in the required site and visit information at the top of the Bird Survey Form (see example on page 11). Stations should be labelled in sequential order in the direction of surveying from A to H (up to 8 stations). Record the route number, station letter, observer number, observer name, visit number (#1 or #2) and date of visit. This information can be filled out prior to arriving at the site once the route is familiar to you. Note that route number and observer number are assigned following your first year's data submission; **first-year participants can leave these fields blank.** The remainder of the information on your data sheets must be completed in the field.

At each station, **prior to beginning your survey, record the survey start time.** Please use the 24-hour (“military”) clock. It is important that we know what time you began your survey at each station.

If you have surveyed your route for more than one year, and the habitat characteristics within any of your stations has changed in that time, please indicate this on the form. An example of this would be if the marsh area in Station D of your route is partially dried-up in Survey Year Two, compared to its condition in Survey Year One. If you have questions about station locations, please contact Kathy Jones through the contact information provided in this manual.

All weather information can be easily estimated. If possible, carry a thermometer and record the air temperature at the start of the survey at each station. Be sure to **specify** whether you are recording the temperature in degrees Fahrenheit (F) or Celsius (C). If you don’t have a thermometer, record the air temperature from a reliable source (e.g., the local weather station, a national weather website or an outdoor thermometer at your home). Wind speed is determined according to the Beaufort Wind Scale and is described in Appendix 4. Cloud cover is estimated as covering so many 10ths of the sky. For example, if no clouds were in the sky you would record 0/10 cloud cover; for a full layer of cloud, you would record 10/10.

Precipitation status is also recorded for each station. As you should not be surveying when there is precipitation, you should fill the “None/Dry” choice circle on the form. If however, conditions change during your survey, this allows us to track these changes. Finally, at each station, please indicate the level of background noise by using the categories and codes provided on the MMP Bird Survey Reference Card. Do your best to estimate the appropriate background noise code.

**Please fill in the Bird Survey Form completely.**

**Recording Bird Observations**
Be sure that you record each individual bird in only one of the four categories: focal species, secondary species, aerial foragers or outside/fly-throughs. In descending order, our priorities are focal species occurring in the marsh survey station area (recorded in the main data table of the form), followed by secondary species occurring in the marsh survey station area (recorded on the Secondary Species Map), aerial foragers, and then outside observations and fly-throughs. When observing many birds at once, always record the highest priority birds first.

Please try to ensure that there are no species identification errors. While the Training CD will help you overcome most identification problems, many calls are difficult to distinguish. Those of the Common Moorhen and American Coot can be particularly difficult. If you can't positively identify either species, then use the generic code “MOOT.”

The only two species for which you will not record individuals of both sexes are Red-winged Blackbird and Yellow-headed Blackbird. Record only the males; both species are polygamous (one male forms pair bonds with several different females) and experience has shown that there are often too many females to track.

Focal Species

The main table on the Bird Survey Form is used to track focal species. A separate record (row) is made for each observed (seen or heard) individual of a focal species during the 15-minute survey. For example, if you hear two different Sora individuals calling at Station A, you will record “SORA” in two separate rows in the Species Code column. For each individual, indicate which response period(s) you saw or heard each of these individuals by filling in the circle under the appropriate response period(s) in which that individual is detected. The following sections detail how to record observations in each response period.

For the first 10 minutes of the survey period (first 5-minute passive period and 5-minute call-broadcast period), focal species individuals are tracked minute-by-minute. At first observation, each individual is added as a new row in the main table using the appropriate four-letter species code and the circle is filled for the minute during which the individual was observed. For each additional observation of the same individual, fill the appropriate circle of that same row for each minute in which that individual is observed. For example, if you hear a Virginia Rail respond to its call broadcast and have not previously heard this individual, you will add VIRA to the Species Code column and fill in the circle under “minute 7-8” (VIRA call period on the Broadcast CD). If this same individual then calls during minute 9, you fill in the circle in the same VIRA row for “minute 9-10” (PBGR call period on the Broadcast CD). A recorded voice will announce each 1-minute interval during the first passive period, while a new species
call will mark the start of each 1-minute interval (30-second call followed by 30 seconds of silence) during the call broadcast period to help you complete the minute-by-minute observations during the first 10 minutes of the survey.

During the call broadcast period the broadcast unit should be held at chest height and aimed so that it broadcasts in front of you. **Record observations for all species seen and/or heard during the call broadcast period, not just observations for those species whose calls are being broadcast.**

Marsh birds may not respond immediately to the call broadcast. The second 5-minute passive period is included to ensure that delayed responses are recorded. Unlike the first two periods (first passive and call-broadcast), focal species individuals are **not** tracked minute-by-minute during the second passive period. Rather, if you observe a focal species individual at any time during the 5-minute period, you simply fill in the circle under the “Passive min. 10-15” column. If this individual was detected earlier in the survey, fill the circle under the “Passive min. 10-15” column for that individual's row; if not previously detected, add a new row and fill in the circle under the “Passive min. 10-15” column.

**Focal species are tracked at an unlimited distance.** For each focal species individual tracked throughout the entire 15-minute survey period, we ask that you estimate whether the bird is inside or outside of the 100-metre (110-yard) station area at the time of its first detection. If you estimate the bird is **within** the 100-m survey station area, fill in the circle under the “Within 100 m” column; if you estimate it is **outside** of the 100-m survey station area, leave this circle empty.

There is also a space to record the direction of focal species individuals relative to your position at the sample area focal point. Simply add a dot or dash at the approximate location of the individual within the small representation of your survey station area in the “Direction” column. Although this column is optional, you may find that when recording multiple individuals of the same species, it is helpful to be able to keep track of individuals positioned within your survey station during the 15-minute survey. You may use the secondary species map to track the location of your focal species if you would prefer, but remember, the secondary species map **does not** replace the focal species table information, and focal species are **not** summarized in the Secondary Species Summary table.

Because focal species are surveyed at an unlimited distance, **in some cases you might observe the same individual at more than one station.** Record the individual at all stations it is detected; however, for subsequent observations of previously detected birds, fill in the circle under the “Detected at Previous Station” column to indicate that it has previously been counted. A good example of this is the American Bittern; its call can travel great distances and could potentially be heard at multiple sampling stations.

If you observe a focal species **at your station** before or after the survey period, add a row to the Focal Species table with the appropriate four-letter species code, and fill in the circle under the “Before/After Survey Period” column. An observation outside the 15-minute survey window **cannot** be counted as part of the 15-minute survey period. It is however, important to note their presence in the marsh, so please add them to the table by this method. Birds recorded as observed before or after the survey period are **ONLY** those that were not otherwise observed during the 15-minute survey period. Observations made while travelling to or from your station **cannot** be included, but you can mention them in the Comments section of your Bird Survey Form.

**Mapped Observations/Secondary Species**
Secondary species are recorded throughout the 15-minute survey using the station map. The map on the form represents the survey station area. It is important that you record what direction you are facing in the small box to the right of the map for each station (e.g. “23’ NNE,” or just “NNE” if you can’t take a compass bearing).

Unlike focal species, **secondary species are only counted, recorded and mapped if observed within the 100-m station area.** At first observation of a secondary species individual, record the four-letter species code at the corresponding location on the map. The four-letter codes for the species most likely to be encountered are provided on the MMP Bird Survey Reference Card in your package. You should familiarize yourself with these codes before your first survey.

Secondary species are recorded within each 5-minute period and subscripts written next to the 4-letter species code are used to denote in which of the three 5-minute periods each individual is first observed: 1, 2, and 3 represent the first passive, call-broadcast, and second passive periods, respectively. For example, if you see a Red-winged Blackbird during the first passive period, you would map its species code and the write the subscript “1” (RWBL₁). If you see the same individual again during the survey, nothing is done to that mapped observation, it remains as RWBL₁ since you are only mapping the first observation of an individual. If you observe a Green Heron during the second passive period (third five-minute period), you would map it as GRHE, at its appropriate location on the map. In the frenzy of surveying, it's difficult to be neat, but please try to write legibly. We will proof your Survey Forms when we receive them, so we need to be able to read your writing! **Young of the year are not to be counted, even if independent. We are interested in adults only.**

Information recorded on the secondary species map is transcribed into the Secondary Species Summary table after you have completed each station’s survey. Add a new record to the Secondary Species Summary table for each secondary species observed. Using the subscripts on the map, add the **total number of new observations** for a species for each 5-minute period to the appropriate column in the summary table: subscript 1 = min. 0-5, subscript 2 = min. 5-10, and subscript 3 = min. 10-15. **This section must be filled out prior to submitting your data at the end of the field season.**

Please ensure that each individual bird is recorded only once in the Secondary Species Summary table.
**Marsh Bird Surveys**

**table for the 5-minute period in which it was first detected.** For a given species, the total number of observations for the 15-minute survey should equal the sum of individuals across all three 5-minute periods.

Several symbols are used to distinguish individuals from pairs and family groups, and to track movements within the 100-m survey area. These symbols are described below and on the MMP Bird Survey Reference Card. The symbols, with the species codes, should be used for mapping secondary species on the secondary species map.

**Aerial Foragers**

Aerial foragers are birds seen actively foraging in the air within the survey station area, and not otherwise using the station area. Actively foraging birds are usually seen flying slowly over the station, occasionally diving to the water's surface or picking insects from the air, as opposed to birds simply flying through the area (see Fly-Throughs below). Record each aerial forager species using the appropriate species code within the Aerial Forager Box to the left of the Secondary Species Map. Because there are often many aerial foragers (swallows in particular), it helps if you tally each species separately. To the best of your ability, tally observations of individuals for each species within the column representing the 5-minute survey period in which they were first observed.

Other kinds of birds that may be properly considered as aerial foragers include terns, Belted Kingfisher, Osprey, Bald Eagle and Northern Harrier.

---

**Marsh Bird Mapping Symbols**

- **RWBL**: Bird: seen or heard.
- **RWBL → RWBL**: Known change in position.
- **COYE**: Pair together (assumed mated).
- **CAGO**: Family group seen. Include number of observed accompanying adults only beside the symbol. Do not record number of young.
- **BLTE**: Nest location.
Outside/Fly-Throughs (Additional Species)

Although secondary species are primarily counted from within the 100-m survey station area, you might observe additional secondary species of marsh birds outside the station area. These are considered “Outside” observations, and each observed species is listed in the Outside/Fly-Throughs box to the left of the Secondary Species Map. Fly-throughs are birds (focal or secondary) that fly through the survey station area without landing or foraging during the 15-minute survey. Simply list each fly-through species within the Outside/Fly-Throughs Box. Information about these Outside/Fly-Through species will help determine presence/absence information for bird species occurring in the marsh complex.

Returning your data to Bird Studies Canada

You should return all original copies of your MMP data forms (contact/route, bird, amphibian and habitat) in a single package by July 31st of the survey year to the address listed at the back of this booklet. It is very important that you keep a photocopy of all of your forms for your future reference and to guard against them getting lost in the mail. Alternatively, you may enter your survey data into Bird Studies Canada’s online data-entry webpage. However, you will still need to mail your forms to BSC for quality control purposes. Please contact MMP staff for details.

King Rail
- by Christine Friedrichsmeier
SAMPLE SURVEY

In order to help you understand how to map and record your observations, a sample survey has been provided. The sample MMP Bird Survey Form (see page 11) demonstrates how the following examples would be recorded and you should refer to it as you read through the examples given below. Now, sit back and imagine that you're approaching Station A on your route . . .

You've filled out the route number, station letter, observer number, observer name, visit number and date information at the top of your form, and are ready to begin your survey. Upon arrival at Station A, two Least Bitterns fly up from the sample station area and out of sight. Under the “Species Code” column of the Focal Species Table, you write “LEBI” in two separate rows, indicating that two individuals were detected. These two individuals were observed before the start of the survey, so within each row, you fill in the choice circle under the column “Before/After Survey Period”. As it appeared that each bittern occurred within 100 m of your station focal point, you fill in the choice circle “Within 100 m”.

Next, you fill in the rest of the information on the top of your form. After taking a moment to observe your station and surroundings, you decide to assign a Background Noise Code of “1” for this station. You estimate cloud cover to be five tenths, assess the wind based on the Beaufort scale as “1” and fill in the choice circle to indicate there is no precipitation. Checking the thermometer you brought, you record the temperature as 70°F. Ready to begin, you record the station start time on your form and press “play” on your CD player to begin the 15-minute survey. A double-tone from the CD player marks the beginning of the survey.

As the 5-minute pre-broadcast passive period begins, you quietly listen and scan the marsh for any bird observations. You are quickly rewarded as a Pied-billed Grebe swims into view during the first minute that you are listening. You proceed to write “PBGR” on a new line in the Focal Species table, and fill in the choice circle under the “Pass. min. 0-1” column. As this individual is less that 100 m from you, you fill in the choice circle “Within 100 m”.

There is one lone Tree Swallow foraging within the 100-m station area. As it circles and catches insects out of the air you tally the species in the Aerial Foragers box under the “min 0-5” column.

Although focusing on detecting focal marsh bird species, you notice and map two Red-winged Blackbird males that are calling within 50 m on your right by writing and encircling the four-letter species code (RWBL) for each in their approximate locations within the station on the Secondary Species Map and give each the subscript “1” because they are present during the first 5-minute passive period.

You hear a Swamp Sparrow calling about 40 m to your left. You map the sparrow by mapping its species code (SWSP) and again give it a subscript of “1”.

Soon after, you hear a voice on the CD say “two”. This marks the start of the 2nd minute of the 5-minute pre-broadcast passive period (corresponding to the “Pass. min. 1-2” column). Still seeing the same Pied-billed Grebe, you fill in the choice circle within that individual's row, this time under the “Pass. min. 1-2” column.

As time continues, no additional species are heard or seen until after you hear a voice say “five” for the pre-broadcast passive period minute 4-5. Halfway through this minute you hear the call of an American Bittern off in the distance. You write “AMBI” on a new row, fill in the choice circle under the column “Pass. min. 4-5”. You estimate the bittern is beyond 100 m, so you leave the choice circle for “Within 100 m” empty.
**Marsh Monitoring Program - Bird Survey Form**

**Route #** | **Station (A-H)** | **Observer #** | **Observer Name**
--- | --- | --- | ---
049,97 | A1,864,9 | Kathy Jones

*Please print with BLOCK CAPITALS and mark each individual choice by filling in the corresponding circle.

Has the habitat on your route changed from previous years?  ○ Yes  ● No  ○ N/A

○ Visit 1  Day 2,5 | Month 6,5 | Year 2008 | Station Start Time (24hr) 1806

○ Visit 2  Cloud Cover (10ths) 5  Temperature 70°F

Precipitation  ○ None/Dry  ○ Damp/Haze/Fog  ○ Drizzle  ○ Rain  Background Noise Code (0-4) 1

**FOCAL SPECIES**

<table>
<thead>
<tr>
<th>Species code</th>
<th>American Bittern (AMBB)</th>
<th>Black Rail (BLRA)</th>
<th>Common Moorhen (COMO)</th>
<th>Least Bittern (LEBB)</th>
<th>Square-billed Grebe (SBOG)</th>
<th>Virginia Rail (VIRA)</th>
<th>Yellow Rail (YERA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEBB</td>
<td>● ○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>LEBI</td>
<td>● ○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>PBGR</td>
<td>○ ● ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>AMBI</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>VIRA</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>AMCO</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
<tr>
<td>AMCO</td>
<td>○ ○ ○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
<td>○ ○ ○ ○ ○ ○ ○ ○</td>
</tr>
</tbody>
</table>

**SECONDARY SPECIES**

Aerial Foragers Tally

<table>
<thead>
<tr>
<th>Species</th>
<th>min0-5</th>
<th>min5-10</th>
<th>min10-15</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRE5</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>BANS</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Outside/Fly-Throughs List

| BLTE | MALL |

**Secondary Species Summary**

<table>
<thead>
<tr>
<th>Species Code</th>
<th># Observed*</th>
<th>Species Code</th>
<th># Observed*</th>
<th>Species Code</th>
<th># Observed*</th>
</tr>
</thead>
<tbody>
<tr>
<td>RUBL</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>WODU</td>
<td>1</td>
</tr>
<tr>
<td>SWSP</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>BANS</td>
<td>1</td>
</tr>
<tr>
<td>TRE5</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>BLTE</td>
<td>0</td>
</tr>
<tr>
<td>COYF</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>MALL</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>CAGO</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td>0</td>
</tr>
</tbody>
</table>

*#Observed = The number of individuals mapped and/or actively foraging within the sample area.

**O/F = Outside/flythroughs (Species recorded outside the sample area or flying through the sample area without landing.)
The broadcasted call of the Least Bittern marks the end of the 5-minute pre-broadcast passive period and the beginning of the 5-minute call broadcast period.

Following the Least Bittern call broadcast, you immediately hear a response from a Virginia Rail only a few metres away from you. You write “VIRA” on a new row under the “Species Codes” column, and fill in the choice circle “LEBI min. 5-6” and you fill in the choice circle “Within 100 m”.

The Pied-billed Grebe that you recorded earlier reappears. You fill in the choice circle within that individual's row, under the “LEBI min. 5-6” column. To your disappointment, you don't hear a Least Bittern.

The two Red-winged Blackbird males and the Swamp Sparrow that you recorded previously are still calling, but because you have already recorded their presence, you do not record them again.

You notice a different male Red-winged Blackbird singing to your left, near a group of three female Red-winged Blackbirds. You map the male (RWBL) on your data form but you do not map the females. Since this bird was first observed during the call broadcast period, you give it a subscript of “2”.

You now observe four Tree Swallows in your sample area, and you watch their aerial acrobatics as they circle and catch insects out of the air. Having previously recorded one Tree Swallow, you tally the additional three individuals in the Aerial Foragers box under “min. 5-10”.

Following the call broadcast of the Virginia Rail during minute 7-8, you hear the Virginia Rail you heard earlier call again. Within that individual's row in the focal species table, you fill in the choice circle under the “VIRA min. 7-8” column.

The Pied-billed Grebe that you recorded earlier reappears again. You fill in the “VIRA min 7-8” choice circle for that individual's row.

During the call broadcast period, you see a pair of Common Yellowthroats to your right. The male calls, and then flies away, landing somewhere in the middle of the sample area. You map the pair (COYE) and note the male's change in position on the Secondary Species Map. You give the pair a subscript of “2”.

After the 30 seconds of silence following the final (Pied-billed Grebe) call broadcast, you hear a single tone from the CD player marking the end of the call broadcast period and the beginning of the 5-minute post-broadcast passive period.

Five young coots, accompanied by two adults, emerge from the vegetation. You record the two adults in separate rows of the main data table and fill in the choice circle under the “Pass. min. 10-15” column for each. After estimating their distance to be within 100 m, you fill in the choice circle “Within 100 m” for both adult coots. You then decide to note in the Remarks section that an entire family group was seen.

As you scan the sample area with your binoculars, you spot a Canada Goose sitting on a nest. You map the CAGO using the symbol to indicate that a nest was located. Since you notice the goose during the post-broadcast period you give the bird a subscript of “3”.

Two Black Terns are seen circling over an area of the marsh to your left, beyond 100 metres of you. You record the species in the “Outside/Fly-Throughs” list box but do not record the number of individuals.
You see a Mallard fly overhead high over the marsh. You record MALL as an additional species in the “Outside/Fly-Throughs” list box. Just then, the same Mallard circles around, flies in, and lands in the sample area. You strike out your “Outside/Fly-Throughs” record for MALL and map this individual on the Secondary Species Map, giving it a subscript of “3”.

A Wood Duck flushes from within the sample area and flies away. You map one WODU with a subscript of “3”.

You again watch the aerial acrobatics of the Tree Swallows and notice that there are now 14 individuals. You tally the additional 10 individuals under the “min. 10-15” column of the Aerial Foragers tally box.

You also notice a Bank Swallow foraging with the Tree Swallows. You tally one “BANS” individual in the Aerial Foragers box under the “min. 10-15” column.

You hear a double-tone from the CD player, signalling the end of your survey at this station. As you take a moment to prepare for the next station, a Sandhill Crane calls in the distance. You note the presence of this species in the Comment section.

Once you have completed the survey at Station A, you find a comfortable position and review your survey form. Quickly, you compare your focal species codes to the list provided to ensure that they are correct.

Next, you review and summarize the secondary species. You start by choosing the species that you heard during the pre-broadcast passive period: Red-winged Blackbirds, Swamp Sparrows and Tree Swallows. In the Secondary Species Summary table, you write in each species code (RWBL, SWSP, TRES) in a separate Row under the “Species Codes” column. As a double-check you pull out your Bird Survey Reference Card page and ensure you have each species code correct.

Starting with RWBL, you review your map. Two males had subscripts of 1 identifying them as being first observed during the pre-broadcast passive period. In the RWBL row, you enter a “2” under the “min 0-5” column. You have an additional male blackbird mapped with a subscript “2” since you first noticed this bird during the call broadcast period. In the same row as the first two male red-winged blackbirds, you record a “1” under the column “min 5-10”. Although all three of these birds were observed during other periods of the survey, only your first observation of them is recorded on the form.

You also mapped a Swamp Sparrow with a subscript “1”. Within the SWSP row in the summary table, you record a “1” under the “min. 0-5” column.

You observed a total of 14 Tree Swallows during your survey. Within the “TRES” row, you record “1” in the “min. 0-5” column”, “3” under the “min. 5-10” column, and “10” under the “min. 10-15” column, accounting for all new individuals observed in each 5-minute period.

Next, you check to see if there were any additional species mapped with a subscript of “2”. You see that you recorded a pair of Common Yellowthroats with a subscript of “2”. In a new row in the Secondary Species Summary table, you record “COYE” within the “Species Code” column and a “2” in the “min. 5-10” column.

Next, you review the Secondary Species Map for species with a subscript of “3” and the Aerial Forager Tally for species recorded during the post-broadcast passive observation period. Mallards, Canada Geese, Wood Ducks and Bank Swallows were first observed during this final 5-minute period.
In the Secondary Species Summary table, your list “MALL”, “CAGO”, “WODU” and “BANS” in separate rows. Again you double-check to ensure that the species codes are correct. You saw only one adult at the Canada Goose nest, so you place a “1” under the “min 10-15” column. Both the Wood Duck and the Mallard are recorded as a “1” under the “min. 10-15” column for each.

Finally, you review your Outside/Fly-through List. Here Black Terns and Mallards are listed but the Mallard is crossed off. Although the Mallard was initially recorded as an Outside/Fly-Through, it then landed within your 100-m station area, moving it to the Secondary Species Map. Because this species is already included in the Secondary Species Summary, you do not record it as an “Outside/Fly-through”. In a separate table row, you add the code “BLTE” under the “Species Code” column, and fill in the choice circle under the “O/F” column for that row.

Once your data are summarized, you review your form to ensure all the information is correct. You then pack up your equipment, carefully ensuring nothing is missed, and move to your next station.
APPENDIX 1: Safety First!

Your surveys should be an enjoyable experience, which also means a safe experience. Ultimately, safety is your responsibility, and if you are ever concerned about your safety, don't survey. But, to assist you, keep the following guidelines in mind.

General Survey Safety:
- Carry a flashlight, whistle, cell phone, bug repellent, and spare batteries
- Arrange a designated check-in time with a friend or relative
- Bring a Partner!

Road Routes:
- Wear bright or reflective clothing
- Be aware of traffic
- Park safely off-road or use reflective cones
- Follow all traffic laws

Boat Routes:
- Wear a lifejacket
- Bring bailer(s)
- Have lights for the bow and stern of your boat
- Follow all marine regulations
- Be aware of boat traffic

BRING A PARTNER and IF IN DOUBT, DON'T SURVEY

APPENDIX 2: Tips For Filling In Scannable Forms

Using scannable forms decreases data entry time, thereby decreasing program costs and allowing more time for other important activities. Although the computer scanning program can decipher most writing, following the simple guidelines provided below will ensure accurate and efficient data processing.

- PLEASE USE PEN; please don't use pencil or felt tip pen, these are poorly read by the scanner
- PLEASE PRINT; preferably using block letters. The scanner does not easily decipher stylised writing
- NUMBERS AND TEXT; place one character in each box and keep within the box lines/ticks. Close 0’s and O’s
- PLEASE FILL IN CHOICE CIRCLES; avoid using checkmarks and fill in all applicable choices individually
- MISTAKES HAPPEN; you can mark an error with an "X" and fill in the correct value or use correction fluid. If your mistake is large and you run out of space, place your correction in the nearest comment box, BUT include the section number to which the correction relates (e.g., "I messed up on Visit 1, Station A: there were 10 Barn Swallows not 100").
- LEGIBILITY; if you think your form is no longer legible, contact us and we will mail you a second copy or email you an Adobe Acrobat version.

Some Frequently Asked Questions:

Can the forms be stapled? YES. The four reference marks (four corners of this page) and bar code or a scanning form identification number (lower right corner) must remain undamaged (don't staple through them).

Can I photocopy the forms? YES. Teleform works best with the original document. Please send original forms to BSC and keep copies for yourself. Do not increase or decrease the size of the document when you photocopy them, this may prevent them from being scannable.

Can I use an Adobe Acrobat version of the form? YES. Before printing, ensure that the "fit to page" printer option is not checked. The "fit to page" option may shrink the form enough that it cannot be scanned.
APPENDIX 3: Background Noise Codes*

<table>
<thead>
<tr>
<th>Index</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No appreciable effect (e.g., owl calling)</td>
</tr>
<tr>
<td>1</td>
<td>Slightly affecting sampling (e.g., distant traffic, dog barking, car passing)</td>
</tr>
<tr>
<td>2</td>
<td>Moderately affecting sampling (e.g., distant traffic, 2-5 cars passing)</td>
</tr>
<tr>
<td>3</td>
<td>Seriously affecting sampling (e.g., continuous traffic nearby, 6-10 cars passing)</td>
</tr>
<tr>
<td>4</td>
<td>Profoundly affecting sampling (e.g., continuous traffic passing, construction noise)</td>
</tr>
</tbody>
</table>

* Based on the Massachusetts Noise Disturbance Index

APPENDIX 4: Beaufort Wind Scale

<table>
<thead>
<tr>
<th>Number</th>
<th>Wind Speed</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Kilometers per hour</td>
<td>Miles per hour</td>
</tr>
<tr>
<td>0</td>
<td>0-2</td>
<td>0-1</td>
</tr>
<tr>
<td>2</td>
<td>6-11</td>
<td>4-7</td>
</tr>
<tr>
<td>3</td>
<td>12-19</td>
<td>8-12</td>
</tr>
<tr>
<td>4*</td>
<td>20-30</td>
<td>13-18</td>
</tr>
<tr>
<td>5*</td>
<td>31-39</td>
<td>19-24</td>
</tr>
<tr>
<td>6*</td>
<td>40-50</td>
<td>25-31</td>
</tr>
</tbody>
</table>

* Unacceptable wind strengths for bird and amphibians.
When to Conduct Your Surveys

**Bird Surveys**
- Two visits between May 20 and July 5 at least 10 days apart
- Survey time (morning or evening) is determined at the time of route creation and cannot be changed once a route is established.
- Morning surveys begin as early as 30 minutes before sunrise and end no later than 10:00 h
- Evening surveys begin no earlier than 4 hours before sunset and must be completed by dark
- Weather guidelines: good visibility, warm temperatures (at least 16 °C or 60 °F), no precipitation and little wind.

**Amphibian Surveys**
- Three visits between April and June at least 15 days apart
- In most of the Great Lakes basin, surveys begin no earlier than one half hour after sunset and end before midnight. In northern regions, surveys can start at 22:00 h (i.e., 10:00 p.m.)
- Temperature guidelines: greater than 5 °C (41 °F), 10 °C (50 °F) and 17 °C (63 °F) for surveys 1, 2 and 3 respectively.
- Weather guidelines: little wind, damp nights with no or little rain (avoid persistent or heavy rainfall)

Field Checklist

**Both Survey Types**
- Data forms
- Pen
- Watch or timer (preferably one with an alarm)
- Habitat Description Forms (to fill in or to help relocate your sites)

**Bird Surveys Only**
- Marsh bird broadcast CD (2008 version or newer)
- Binoculars
- Portable call broadcast unit (e.g., portable CD player with amplified speakers)

**Amphibians Only**
- Small flashlight or headlamp

**Optional**
- Compass or G.P.S. unit
- Clip board (if desired)
- Field guide
- Thermometer
- Spare batteries
- Spare pen
- Instruction booklet or Bird Survey Reference Card
- Insect repellant
- Cell phone

Return to Bird Studies Canada:

**Marsh Bird Surveys**
- MMP Contact and Route Information form - 1 per route
- MMP Bird Survey Form - 2 per station (1 for each survey visit)
- MMP Habitat Description Form - 1 per station

**Amphibian Surveys**
- MMP Contact and Route Information form - 1 per route
- MMP Amphibian Route Summary form - 1 per route
- MMP Amphibian Data Form Set - 3 per route (1 for each survey visit)
- MMP Habitat Description Form - 1 per station

**By July 31.** Contact us if you have any questions or comments.
MAJOR SUPPORTERS AND PARTNERS OF THE MARSH MONITORING PROGRAM:

Bird Studies Canada
Environment Canada – Canadian Wildlife Service
U.S. Environmental Protection Agency

For more information about the Marsh Monitoring Program contact:

Aquatic Surveys Volunteer and Data Coordinator
Bird Studies Canada, P.O Box 160, Port Rowan, Ontario, Canada, N0E 1M0
Phone: (519) 586-3531 Toll Free: 1-888-448-BIRD (2473)
Fax: (519) 586-3532 Email: aqsurvey@birdscanda.org