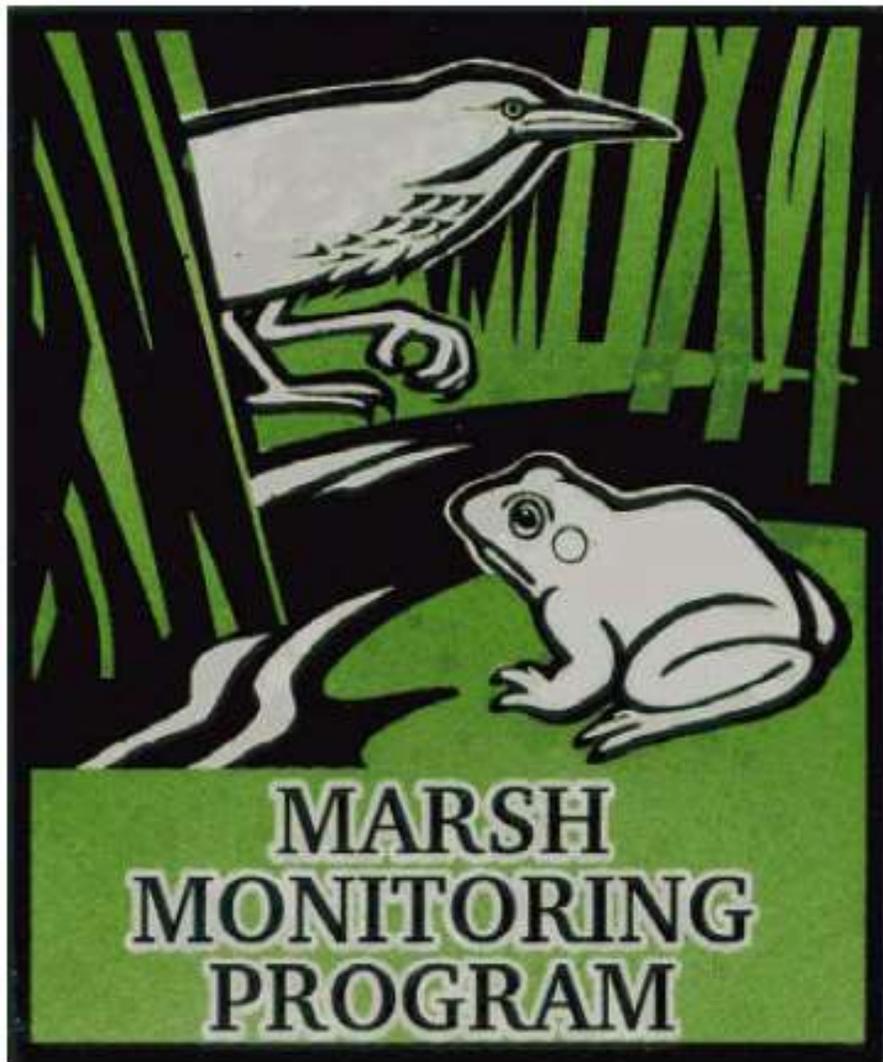




Maritimes Marsh Monitoring Program



Instructions for Surveying Marsh Birds and their Habitats
2020 Edition



About these instructions

We want to clearly instruct participants in all aspects of the Maritimes Marsh Monitoring Program. Please read this instruction booklet thoroughly and adhere to the protocols carefully. If you would like to sign up to volunteer or have any questions/comments, please give us a call at **902-579-4734** or email **L.Achenbach@birdscanada.org**.

The instruction booklet is divided into four general sections: **a general overview of the Maritimes Marsh Monitoring Program, bird survey protocol, habitat survey protocol, and appendices**. Example surveys and datasheets, are found at the very end. Please read the protocols and review all bird species before surveying each year. In order to limit possible disturbance, we ask that the survey call broadcast file is used only during surveys and not during other birding activities. Thank you!

Many thanks to all our dedicated volunteers; your efforts are helping the marshbirds of the Maritime provinces, and we recognize your contributions!

Suggested Citation: *Maritimes Marsh Monitoring Program - Instructions for surveying marsh birds and their habitats. 2020. Birds Canada, Sackville, New Brunswick, Canada.*



TABLE OF CONTENTS

THE MARITIMES MARSH MONITORING PROGRAM.....	3
How Does the Program Help to Conserve Marshes and their Inhabitants?.....	3
Who Can Participate?	4
What Are the Participant’s Obligations?.....	4
What is a Marsh Monitoring Program Survey Station?.....	5
RETURNING YOUR DATA TO BIRD STUDIES CANADA.....	5
BIRD SURVEY PROTOCOL.....	6
When Should I Conduct Surveys?	6
Field Checklist.....	7
Marsh Bird Call Broadcast	7
Survey Day.....	8
Recording Site and Weather Condition Information.....	8
Recording Bird Observations	9
HABITAT SURVEY PROTOCOL.....	14
When Should I Conduct Surveys?.....	14
Site Information.....	15
Section Descriptions: A-J	15
APPENDIX 1: Safety First!.....	21
APPENDIX 2: Reminders and Common Mistakes.....	22
APPENDIX 3: An Example of a Typical Bird Survey (and corresponding datasheet).....	23
APPENDIX 4: Example Habitat Survey Datasheet.....	28
APPENDIX 5: Our Funders and Partners.....	30



Margaret Campbell

THE MARITIMES MARSH MONITORING PROGRAM

Wetlands are among the most productive ecosystems in Canada and play valuable roles on the landscape. Wetlands, and marshes in particular, filter water out of sediment and contaminants, cycle water-borne nutrients, recharge groundwater flows, mitigate flooding and erosion, and provide essential habitat for a diverse array of wildlife. Historically, wetlands were regarded as wastelands. Consequently, countless wetlands have been lost, fragmented, or otherwise degraded due to human influences. Despite an increasing awareness of the value of these ecosystems, wetlands continue to be lost and damaged throughout Canada. This destruction has given rise to concerns about the viability of populations of many bird species that depend on wetlands for one or more portions of their life cycle.

The goal of the Maritimes Marsh Monitoring Program is to serve as a long-term monitoring and assessment program for waterfowl, migratory gamebirds, other wetland-associated species, and their habitats in the Maritimes.

How Does the Program Help to Conserve Marshes and their Inhabitants?

Over the long-term, our collective goal is to assess and monitor the status of wetland-associated species and the habitats upon which they depend, in order to help establish wetland conservation and management priorities for the Maritimes.

Long-term objectives are:

- 1) Monitor trends in wetland-dependent species population size, occupancy, distribution and abundance across the Maritimes.
- 2) Gain a better knowledge of wetland species-habitat associations and habitat features that influence occupancy, abundance and distribution.
- 3) Evaluate effectiveness of current management activities for wetland-associated species, including wetland restoration and protection schemes.
- 4) Identify additional high priority wetlands for conservation.
- 5) Actively engage the public in wetland conservation and research.



Allison Manthorne

Who Can Participate?

The Maritimes Marsh Monitoring Program offers everyone, from amateur naturalists to professional biologists, a unique and rewarding opportunity to contribute to the knowledge and conservation of one of North America's most threatened ecosystems. However, participants need to have the skills necessary to conduct the surveys. It is important that species are correctly identified. Regardless of experience, participants will need to become familiar with the survey protocol that is described in this booklet.

If you are unsure of your ability to survey a route, after reading these instructions, please contact us. We may be able to put you in touch with a more experienced surveyor who needs field assistance. After you've assisted a surveyor for a field season, you may feel ready to survey your own route the following year!



Margaret Campbell

What Are the Participant's Obligations?

The MMMP is meant to be an enjoyable and interesting experience, but there is a time commitment involved. Each survey route consists of a series of points (ranging from 3-10 points). Each station should be visited two times during the breeding season in the early morning. On average, the total time required to complete an MMMP survey season will be about 12 hours combined. The first survey season may have a slightly greater time commitment as you become familiar with your route, the survey protocol, and datasheets.



Allison Manthorne

What is a Marsh Monitoring Program Survey Station?

In order to compare bird counts at different locations and at different times, it is necessary that the methods be standardized as much as possible to control for various factors that may bias the count. A common standardized method for counting birds is known as a 'point count'. During a point count, an observer stands at a central point and records everything they hear and see within fixed distances and within a set time frame. By recording observations within these constraints, the point count method minimizes some bias so that counts best reflect actual differences in the number of birds present.

MMMP surveys are based on this point count methodology. Each survey is conducted from the central point, here referred to as the 'survey station', or 'point'. During the 15-minute survey, Primary bird species observations are recorded using an "unlimited-distance" point count, but participants are asked to use their best judgment to record whether each bird is observed between 0-50m, 50-100m, >100m.



U.S. Geological Survey
Patuxent Wildlife Research Center

RETURNING YOUR DATA TO BIRDS CANADA

Please return your completed bird and habitat data sheets by August 1st of the survey year.
You can do this by:

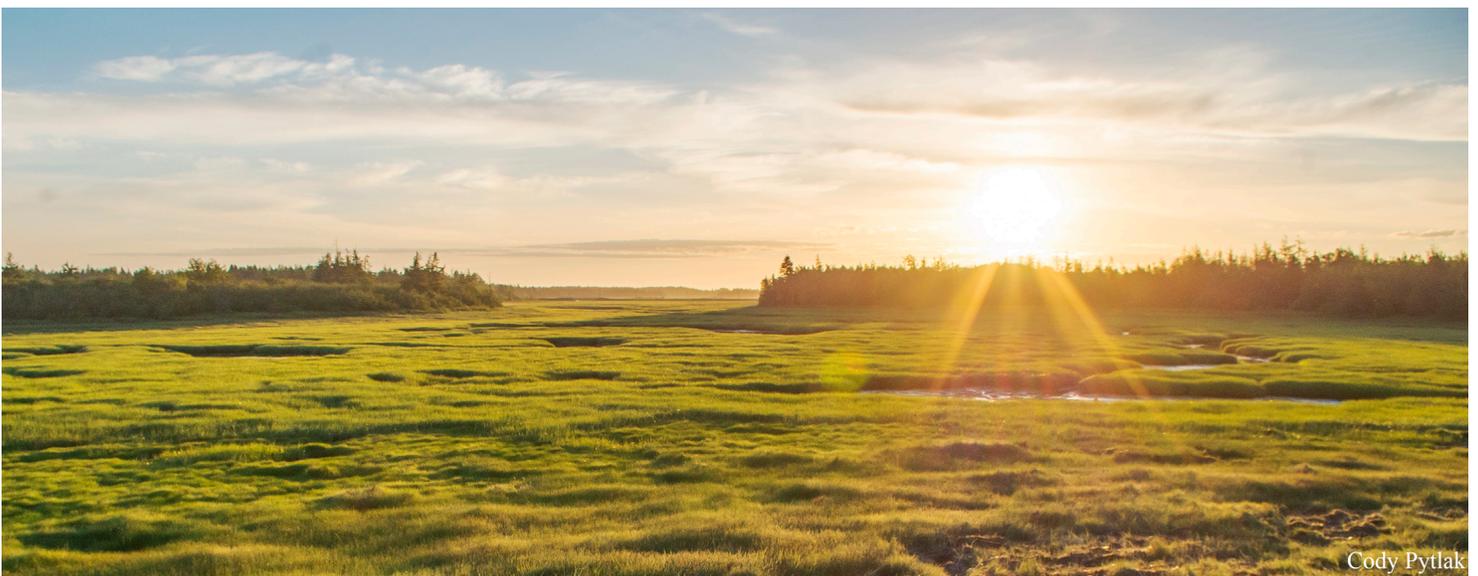
- 1) scanning or photographing your data forms and sending them to Laura Achenbach at **LAchenbach@birdscanada.org**
- and/or
- 2) mailing or dropping off original copies in a single package to the address below. It is very important that you keep a photocopy of all of your forms for your future reference and to guard against them getting lost in the mail.

Original forms can be sent to:
Maritimes Marsh Monitoring Program
Birds Canada/Oiseaux Canada
PO Box 6227
17 Waterfowl Lane, Sackville, N.B.,
E4L 1G6

BIRD SURVEY PROTOCOL

When Should I Conduct Surveys?

- Each marsh bird routes are surveyed **two times** per year between **25 May and 15 July**. Successive surveys of the same route must be conducted at least 14 days apart.
- Surveys should begin ~30 minutes before sunrise and end no later than 10:00 a.m. Sunrise times vary with location and time of year, so check with the local weather station for this information.
- A survey route can consist of three to ten survey points. Each point is surveyed for 15 minutes. The time to complete one survey route will depend on the number of points and the distance between them. It is a good idea to walk your route to figure out how long it will take to travel between points before conducting your first survey.
- Surveys should be undertaken in weather that is favorable for surveying birds: good visibility, reasonable temperatures, no precipitation, and minimal wind. If weather does not meet these criteria, please conduct surveys on another day. For more information on weather criteria see page 8.
 - All but the lightest drizzle suppresses bird activity and interferes with our ability to hear, not to mention soaking you and your forms.
 - Strong wind not only reduces bird-calling activity, it also limits our ability to hear and distinguish bird calls. If the wind is strong enough to raise dust or loose paper and move small tree branches, wait for calmer weather. We want participants to find these surveys interesting and pleasant, not a burden. Pick a nice morning to conduct the survey!



Cody Pytlak



Field Checklist

It's best to be prepared! Below is a list of items required for each field visit, and an additional selection of items that participants may find useful. Feel free to supplement this list with other items that might be needed.

Required Items:

MMMP Survey Sheets* (Bird and Habitat)
GPS (or smartphone with your points on a map app)
Binoculars
Pens or Pencil (bring a back-up)
Clipboard (or something hard to write on)
Broadcast Unit (MP3 player and speakers)
Spare Batteries (if applicable)
Watch
Thermometer

Recommended Items:

Compass or Map
Flashlight
Cell Phone
Bird ID Field Guide
Water and Snacks
Mosquito repellent
This instruction booklet
Plant instruction guide

*We suggest filling out some of the information (observer identification, study site, point ID) on the bird survey form the night before the survey.

You might want to bring an assistant along for company and to share in the experience. This person can help find your points, hold your broadcast unit, and document information such as weather conditions. However, **only you can be an observer**; you must find, identify, and count all the **birds unaided**. More than one observer will bias the results of our statistical analyses (see page 9 for more information).

Marsh Bird Call Broadcast

Although some marsh bird species are elusive, they can often be coaxed into responding to a broadcast of their call. Included in the survey mp3 file is a 5-minute sequence of broadcast-recordings for the calls of the following species: Least Bittern, Nelson's Sparrow, Virginia Rail, Sora, and Pied-billed Grebe. Each species call-broadcast is 30 seconds, followed by 30 seconds of silence.

If you are using your own speaker, it must be loud enough to be heard well at a distance of 100 meters; recruit a friend to help establish that calls can be heard at the appropriate distance. If calls cannot be heard clearly from 100 meters, the speaker may need to be upgraded. Contact us to borrow equipment or for speaker recommendations.



Allison Manthorne

Caution: Please do not play the broadcast calls more than necessary as birds can be disturbed from their territories if played too often.

Survey Day - See Appendix 3 for an in-depth example of a survey!

Access to most marshes requires participants to approach the survey station by foot. If possible, note any birds that flush or go into hiding as you near the station, particularly for any species that commonly use open water habitats (e.g. ducks, coots, and grebes). These birds should be incorporated into the first 5-minute survey interval for Secondary Species, and in the ‘Before Survey Period’ column for Primary Species (this will become clear after reading the ‘Recording Bird Observations’ section).



Upon arrival at the survey station, immediately set up the broadcast unit and thermometer, record the survey information and the start time, and begin the point count. The idea is to arrive at the station and begin the survey as soon as possible (i.e. within 3 minutes). Upon completion of the survey and before leaving the station, look over your entire datasheet to ensure that it is complete, and check that no personal items have been dropped.

Recording Site and Weather Condition Information

Cloud Cover is estimated as covering 10^{ths} of the sky. For example if there are no clouds present a 0 is recorded, if it is fully overcast record a 10.

Allison Manthorne



Temperature is recorded in degrees Celsius. Record the air temperature at each station with the supplied thermometer. Be sure to keep it out of direct sunlight. If you don’t have a thermometer, leave this space blank and we will fill it in with data from the closest weather station.

Precipitation is recorded on a scale from 0 to 3; 0 is no precipitation, 1 is damp or foggy conditions, 2 is light drizzle and 3 is consistent rain (Table 1). Point counts should not be initiated when the precipitation code is 2 or 3 but if conditions change during the survey, codes allow us to track those changes.

TABLE 1. Precipitation codes

Precipitation Codes	Description
0	None
1	Damp/Moist/Fog
2	Drizzle
3	Rain

*Shading indicates unacceptable precipitation levels to initiate bird surveys

Wind Speed is estimated using the Beaufort Scale (Table 2). Surveys should not be initiated when the wind speed is 4 or above but if conditions change during the survey, wind speed codes allow us to track those changes.

TABLE 2. The Beaufort Wind Scale

Beaufort Number	Description	Wind Speed (km/h)	Effects
0	Calm	<1	Air calm, smoke rises vertically
1	Light Air	1-5	Light air movement, smoke drifts
2	Light Breeze	6-11	Wind felt on face, leaves rustle
3	Gentle Breeze	12-19	Leaves and small twigs in continual motion, wind extends light flags
4	Moderate Breeze	20-29	Wind raises dust, loose paper, moves small branches.
5	Fresh Breeze	30-39	Small trees begin to sway, white crested wavelets form on inland waters
6	Strong Breeze	40-49	Large branches in motion, telephone wires “whistle”

* Shading indicates unacceptable wind strengths for bird surveys.

Wind Direction is approximated on the 16 point compass (e.g. N, NNW, NW, etc.) and is referenced in terms of the originating direction (not the direction it is travelling).

Background Noise is recorded on a scale of 0-4 (Table 3). It provides an indication of the ambient noise at a site that may interfere with detecting birds. If you want you can add a note below as to the source of the noise (e.g. traffic, barking dogs, etc.). When deciding on your survey days, keep potential noise in mind; for example, if your route is near a busy road, consider surveying on a weekend.

TABLE 3. Noise Scale and Descriptors

Noise Code	Description	Effects
0	No appreciable effect	Owl calling
1	Slightly affecting sample	Distant traffic, dog barking, car passing
2	Moderately affecting sampling	Distant traffic, 2-5 cars passing
3	Seriously affecting sampling	Continuous traffic nearby, 6-10 cars, equipment operating nearby
4	Profoundly affecting sampling	Continuous traffic passing, construction noise

Recording Bird Observations

While we encourage survey participants to bring a partner while they conduct their route, it is important that **only one person conduct the survey**. The chance of detecting all birds at a station is never 100%, even for the most experienced birder; therefore bird counts from MMMP surveys are corrected for this imperfect detection to better estimate the actual number of birds present. This ‘correction factor’ is based on average detection probabilities from a single observer. If more than one observer contributes to a survey, the results will be biased from the other standardized surveys.

Birds are detected during 15-minute point counts, with either an unlimited or 100-m radius depending on the species class (Primary or Secondary). Observers will count all individual birds seen or heard within this period. Point counts begin with a 5-minute silent listening period, followed by a 5-minute call-broadcast period where vocalizations of 5 cryptic species are played, and ends with another 5-minute silent listening period. During point counts, Primary focal species (Table 4) will be recorded within an **unlimited radius**. Secondary Species (Table 5) will only be recorded if detected **within 100m** of the observer.

Primary Species

Several species of marsh birds are difficult to survey since they are elusive, cryptic or vocalize infrequently (e.g. rails, bitterns, grebes); these cryptic birds are the main focus of the MMMP. There are 12 Primary Species in our protocol, listed in Table 4. For these species, an intensive minute-by-minute recording method as well as call-broadcasts are used. For convenience, the provided survey mp3 file clearly indicates each passing minute and automatically plays the species' calls.

All Primary Species must be documented using a separate row for each individual of each species detected during the 15-minute survey. Thus, each time a new individual is detected, a new row is added to the data sheet.



TABLE 4. Species names and codes (in brackets) for all Primary Species in the MMMP

American Bittern (AMBI)
Least Bittern (LEBI)*
Pied-billed Grebe (PBGR)
Sora (SORA)
Virginia Rail (VIRA)
Yellow Rail (YERA)*
Common Gallinule (COGA)
American Coot (AMCO)
Common Gallinule / American Coot (GOOT)†
Nelson’s Sparrow (NESP)
Marsh Wren (MAWR)
Black Tern (BLTE)
Willet (WILL)

* indicates a species at risk
 † use code only if heard and not seen

During the first two 5-minute blocks of the survey, observers are required to record each Primary Species each minute they are seen or heard. During the final 5 minutes of the survey, Primary Species detections are only recorded once for the five-minute period. If Primary Species are detected as you are arriving to or departing from the survey point, these individuals are also included on the datasheet. Please note that only 5 of the 12 Primary Species vocalizations are included during the call-broadcast, but all 12 species must be recorded using the protocol outlined above.

Note that there are two exceptions or additional qualifications to the above instructions:

1. Black Terns often gather in large groups, and tracking individuals can be overwhelming or even impossible. For only this species, one row can be used for all individuals detected in the survey, noting the total number seen each minute. Estimates of flock size are accepted.

2. American Coot and Common Gallinule vocalizations are very similar and often difficult to distinguish, therefore observers should use the code GOOT when American Coots or Common Gallinules are detected by sound ONLY. When either species is seen, use the appropriate code (AMCO or COGA).



Observers will also record how each Primary Species was detected: aurally (by sound, “A”), visually (by sight, “V”), or both. Individuals

detected by sound should be recorded by circling the “A” on the data sheet while species detected by sight should be recorded by circling the “V”. Any individual detected by sight and sound should be recorded by circling both “A” and “V”. For example, if in the 2nd minute of the point count silent listening period you hear a Pied-billed Grebe (PBGR), circle “A” under the 2-3 minute heading; then in the 3rd minute it swims into sight, circle “V” under the 3-4 minute heading; and in the 7th minute it calls while in sight, circle “AV” under the 7-8 minute heading. Knowing if a species was detected by sight, sound, or both, helps calculate detection probabilities and gives us an idea of how best to survey for these species in the future.

Observers also need to estimate the distance of Primary Species from the focal point (i.e., where they are conducting the point count). Observers do not record exact distances, but rather if an individual occurred within 50m of the observer, between 50-100m, or greater than 100m. Always

choose the closest distance class; for example, if a PBGR is initially detected over 100m away in minute 2, then moves between 50-100m in minute 3, then again greater than 100m away in minute 7, the distance class chosen is 50-100m.



Critically, to ensure one individual isn't counted multiple times, indicate whether or not the individual Primary Species in each row were heard at a previous point that you already surveyed that morning. For example, the first point count will be "No" for all Primary Species, as you haven't completed any other surveys that day to have heard them. If on that first survey you hear a very distant PBGR >100m to the south, and you then travel south to your next point to find a PBGR, you might circle “Yes” to indicate that this is likely the same individual you heard on your first survey.



Secondary Species

Observers are required to identify and record any additional species detected during the point count. Table 5 lists common or species of interest, but any detected bird that isn't a Primary Species is a Secondary Species, regardless of whether it is found in this table. Contrary to primary species, only individuals that fall within a 100m radius are counted. They are also only counted in three 5-minute blocks (handily separated by the two 5-minute listening periods and the 5-minute call-broadcast period). Each species gets its own row with individuals tallied in the adjacent columns for each time block. Only record the maximum number of individuals for each 5-minute block.

For example, if in a 5-minute period 3 Tree Swallows forage over the marsh, fly out of sight, and then 2 fly in and continue foraging, the Tree Swallow total is "3" as you don't know whether the 2 are different or the same individuals as the first group.

Ducks

Ducks are included as Secondary Species; but we ask that observers identify and count the number of drakes (males), hens (females) and young observed, for each species, within each 5-minute interval. When entering the data into the table use only one row for each species and include the counts of all drakes, hens and chicks. For example, if 5 male MALL, 3 female MALL and 5 chicks are seen in a 5-minute interval, write something like 5D/3H/5Y (D=drake, H=hens, Y=young). At some wetlands, counting ducks with this level of detail will keep observers very busy. In these situations count the ducks in just one of the 5-minute intervals.



Aerial Foragers (AF) and Outside Fly-throughs (OF)

Fly-throughs are individuals that are simply moving through the site without using the habitat in any way (e.g., often gulls, but can be any species including wetland birds). Secondary species that fly over should be given their own line on the datasheet (even if that species has already been noted on the point count) and indicated that they are fly-throughs in the appropriate column. Aerial foragers are individuals that are actively foraging within the site, but remain in flight. This includes aerial insectivores like swits and swallows. Check off the appropriate column if an individual was foraging in the air.



Red-winged Blackbirds

For Red-winged Blackbirds, record males only. As one male forms pair bonds with several different females, experience has shown there are often too many females to follow their movements.

TABLE 5. Species names and codes (in brackets) for some Secondary Species in the MMMP; observers are required to be able to identify all species secondary species by sight and sound. Species in **bold** are EHJV priority species, species in *italic* are NB-ERD habitat association target species, * indicates a species at risk.

<p style="text-align: center;"><u>WATERFOWL</u></p> <p>American Black Duck (ABDU) <i>American Wigeon (AMWI)</i> <i>Blue-winged Teal (BWTE)</i> Common Goldeneye (COGO) Common Merganser (COME) Red-breasted Merganser (RBME) Hooded Merganser (HOME) Canada Goose (CAGO) Gadwall (GADW) Green-winged Teal (GWTE) <i>Northern Pintail (NOPI)</i> <i>Northern Shoveller (NOSH)</i> Ring-necked Duck (RNDU) Wood Duck (WODU) <i>Mallard (MALL)</i> Mallard-Black Duck Hybrid (MBDH) Redhead (REDH) Greater Scaup (GRSC) Lesser Scaup (LESC)</p> <p style="text-align: center;"><u>HERONS AND ALLIES</u></p> <p>Great Blue Heron (GBHE) <i>Green Heron (GRHE)</i></p> <p style="text-align: center;"><u>CORMORANTS</u></p> <p>Double-crested Cormorant (DCCO)</p> <p style="text-align: center;"><u>LOONS</u></p> <p>Common Loon (COLO)</p> <p style="text-align: center;"><u>GULLS, TERNS AND SHOREBIRDS</u></p> <p>Great Black-backed Gull (GBBG) Ring-billed Gull (RBGU) Herring Gull (HERG) <i>Black Tern (BLTE)</i> Common Tern (COTE) American Woodcock (AMWO) Wilson's Snipe (WISN) <i>Greater Yellowlegs (GRYE)</i> <i>Solitary Sandpiper (SOSA)</i> Spotted Sandpiper (SPSA) Wilson's Phalarope (WIPH) Upland Sandpiper (UPSA)</p>	<p style="text-align: center;"><u>RAPTORS</u></p> <p><i>Short-eared Owl (SEOW)</i> <i>Northern Harrier (NOHA)</i> Osprey (OSPR) Bald Eagle (BAEA)</p> <p style="text-align: center;"><u>NEAR PASSERINES</u></p> <p>Belted Kingfisher (BEKI) <i>Three-toed woodpecker (ATTW)</i> Black-billed Cuckoo (BBCU)</p> <p style="text-align: center;"><u>PASSERINES</u></p> <p><i>Alder Flycatcher (ALFL)</i> <i>Yellow-bellied Flycatcher (YBFL)</i> <i>Willow Flycatcher (WIFL)</i> <i>Great-crested Flycatcher (GCFL)</i> Eastern Kingbird (EAKI) Bank Swallow (BANS) Barn Swallow (BARS) Cliff Swallow (CLSW) Northern Rough-winged Swallow (NRSW) Tree Swallow (TRES) Purple Martin (PUMA) Sedge Wren (SEWR) Marsh Wren (MAWR) <i>Warbling Vireo (WAVI)</i> <i>Brown Thrasher (BRTH)</i> <i>Grey Catbird (GRCA)</i> <i>Cedar Waxwing (CEDW)</i> Chipping Sparrow (CHSP) Clay-coloured Sparrow (CCSP) Field Sparrow (FISP) Grasshopper Sparrow (GRSP) <i>Lincoln's Sparrow (LISP)</i> Savannah Sparrow (SAVS) Swamp Sparrow (SWSP) Vesper Sparrow (VESP) <i>Palm Warbler (PAWA)</i> <i>Yellow Warbler (YEWA)</i> <i>Canada Warbler (CAWA)*</i> <i>Northern Waterthrush (NOWA)</i> Common Yellowthroat (COYE) Common Grackle (COGR) Red-winged Blackbird (RWBL) <i>Rusty Blackbird (RUBL)*</i> <i>Baltimore Oriole (BAOR)</i></p>
---	--

HABITAT SURVEY PROTOCOL

Habitat associations for many species of wetland birds are not well-known. A good understanding of these relationships is essential to designing effective wetland management and conservation practices. When combined with information on trends in species occurrence or abundance, data on vegetation and other wetland characteristics help to identify those wetland habitats most at risk of losing their ability to support marsh birds.

Habitat descriptions are limited to the area within a 100m radius around the station. The data sheet consists of ten sections (A-J) each described below. In addition, there is a spot to sketch a map of the survey area to delineate major habitat types and patches of vegetation within the points. The sketch is not necessary to complete, but drawing the various habitat types visible from the point count station can help determining your estimates. You can also use a smartphone to look up the satellite imagery of your sites (e.g., Google Maps) if you can't easily see a 100m radius, but be aware that the imagery may be out of date.

Remember these values are **ESTIMATES** only, so you do not need to spend a lot of time trying to calculate percentages. These surveys should ideally take only 5-10 minutes. If you're uncomfortable doing these surveys yourself (bird people are not necessarily plant people!) feel free to enlist a friend to help, or contact us to conduct them instead.

When Should I Conduct Surveys?

Habitat surveys are conducted once a year for each point count station. This data should be collected when plants can be readily identified, most easily during the second bird survey visit or by making a third trip out to the survey points.



Site Information

The top portion of the datasheet identifies the date, site details, and observer information. Unlike with bird surveys, multiple observers are allowed to complete the habitat survey.

Section Descriptions: A-J

A. Wetland Type

This section gives an overall picture of the type of wetland where each point count station occurs. Chose the most appropriate habitat(s) and indicate with an x in the adjacent box. What follows is a brief description of the various wetland types:

- **Deep Marsh:** Emergent wetlands and marshes with permanently flooded standing water ≥ 2 m deep at mid-summer, often with floating vegetation, emergent vegetation, and shrubs.
- **Shallow Marsh:** Emergent shallow marshes that maintain water throughout the growing period, with water levels decreasing below 2m at mid-summer. Often impounded wetlands.
- **Bog:** Wetlands typically covered by peat with a saturated water regime and a *closed* drainage system, frequently covered by ericaceous shrubs, sedges, and sphagnum moss and/or black spruce.
- **Fen:** Wetlands typically covered by peat with a saturated water regime and an *open* drainage system, typically covered by sedges.
- **Wet Meadow:** Emergent (seasonally flooded) floodplain wetlands that are dominated by *Spartina* grasses as well as adjacent idle fields and pasture.
- **Alder/Shrub Wetland:** Includes tall shrub and cedar swamps near water, not associated with peatlands and alder thickets.
- **Treed Peatlands/Swamp:** Sites dominated by black spruce, sphagnum moss, swamps, treed and shrub edges of bogs and fens near standing water and beaver ponds.
- **Riparian Floodplain/Forested Wetlands:** Includes bottomland hardwoods and tall shrub swamps with standing water and seasonally flooded forests within river floodplains.
- **Coastal wetland/Saltmarsh:** Coastal wetlands include all wetlands in coastal watersheds that drain directly to an estuary or bay and into the ocean. Saltmarshes typically line bays and estuaries, are dominated by *Spartina* grasses, and are subject to tidal forces.
- **Coastal Plain:** An area of flat, low-lying land adjacent to a seacoast.

B. Wetland Modifier

Identify any modifications to the wetland that may be affecting the point count area (100m radius), or that alter the flow of water in the wetland. Choose as many categories as you think apply.

- | | | | |
|------------------------|-----------------------------|----------------------|----------------------------|
| 1. Beaver Pond/Dam | 5. Fish Ladder | 9. Urban/Residential | 13. Natural/Protected Area |
| 2. Impoundment | 6. Roadside/Trail/Boardwalk | 10. Rocky Shore | 14. Sewage Lagoon |
| 3. Dykes/Berms | 7. Industrial | 11. Beach/Tidal Flat | 15. Pollution |
| 4. Channel/River/Ditch | 8. Agriculture | 12. Dune | 16. Other (specify) |



C. Water Regime

Identify the amount of standing water in the area.

- **Permanently flooded:** $\geq 20\%$ of the wetland area is covered by standing surface water for all or most of the growing season.
- **Saturated:** The ground is saturated to the surface for extended periods during the growing season but $<20\%$ of the wetland is covered by standing surface water.
- **Seasonally flooded:** May only have surface water present on the wetland for a short period during the growing season in most years.
- **Tidal:** Coastal or estuarine points that are influenced by the tides.



D. Major Wetland Habitats within the Station Radius

Percentages of major habitats occurring within 100m of the point count station should be estimated and recorded in this section. Each major habitat type is further described below in sections **E-J**.

The sum of all habitats in this section should be 100%. In order to not go over 100%, imagine you are looking at the site from above so that tall, broad vegetation is included, and not the habitat below it; e.g., if a group of trees encompassing 15% of the site has grass growing below the canopies, only the tree cover is counted in that area. If possible, it can be helpful to use a smartphone to look up satellite imagery to determine the category breakdown.

- **Large patches of open water/floating plants:** Open water is defined as any patch of water that is at least 1x3m (4x8ft), almost or entirely free of emergent herbaceous vegetation like cattails. If you can float a small canoe on it, chances are it's open water. It may consist partially or completely of submerged or surface floating aquatic vegetation (e.g., Pondweeds (*Potamogeton* spp.), Duckweeds (*Lemna* spp.)).
- **EMERGENT herbaceous vegetation:** Non-woody plants that are rooted in shallow water but have their main vegetative structure above the water (e.g., Cattails (*Typha* spp.), Common Reed (*Phragmites australis*), Bulrushes (*Scirpus* spp.)).
- **NON-EMERGENT herbaceous vegetation:** Non-woody plants that are rooted on dry land (e.g., Goldenrod (*Solidago* spp.), grasses in areas that don't flood). These are often plants found growing on dykes or in nearby fields or roadsides.
- **Shrubs:** Shrubs are defined as woody plants, often multi-stemmed, 1-3m tall (e.g., Dogwoods (*Cornus* spp.), Serviceberries (*Amelanchier* spp.), Willows (*Salix* spp.)). This category also includes tree species saplings under 3m tall.
- **Trees:** Trees are defined as being taller than 3m (e.g., Maples (*Acer* spp.), Spruces (*Picea* spp.)).
- **Exposed Substrate:** Any area devoid of surface vegetation and water coverage (e.g., sand dunes, rock outcroppings, exposed marsh sediment, boardwalks, roads).

As with Section D, the sum of % cover within sections E-J will always equal 100%.

E. Open Water and Dominant Floating Plants:



These are plants that are either free floating (e.g. duckweed) or may be rooted in the marsh bottom with leaves floating on the water's surface (e.g. waterlilies).

Estimate the percentage of the open water, and each of the dominant floating plant species. These values should sum to 100% unless the “No open water/floating plants” box is checked.

Do not include species that cover <5% of the floating water, unless these scant species together add up to 5% or greater coverage. In this case, make a new species category called "<5%" on the line provided.

F. Dominant EMERGENT Herbaceous Vegetation:

These are non-woody plant species that are rooted in the marsh bottom and have stems that rise up and out of the water (e.g. some grasses and sedges, cattails, wild rice, arrowhead, pickerel weed). Many of these species provide important substrate for foraging and nesting for marshbird species.



Estimate the percentage of the dominant emergent herbaceous species. These values should sum to 100% unless the “No emergent vegetation” box is checked. Do not include species that cover <5% of the total emergent herbaceous vegetation cover in, unless these scant species together add up to 5% or greater coverage. In this case, make a new species category called "<5%" on the line provided.

G. Dominant NON-EMERGENT Herbaceous Vegetation:



These are non-woody plant species that are rooted in dryer earth than the waterlogged marsh. These can include species that grow along dykes/berms, raised islands within a marsh, and in nearby non-marsh habitat such as fields or forests.

Estimate the percentage of the dominant non-emergent herbaceous species. These values should sum to 100% unless the “No non-emergent herbaceous vegetation” box is checked. Do not include species that cover <5% of the total non-emergent herbaceous vegetation cover, unless these scant species together add up to 5% or greater coverage. In this case, make a new species category called "<5%" on the line provided.

H. Dominant Shrub Vegetation:

These are multi-stemmed woody species 1-3m tall that are often found on the periphery of marshes or in wetland shrub habitats. Dominant shrub types can include alder, willows, dogwoods, meadowsweet, bog rosemary, leatherleaf, Labrador tea and saplings of trees such as red maple.



Estimate the percentage of the dominant shrub species. These values should sum to 100% unless the “No shrub vegetation” box is checked. Do not include species that cover <10% of the total shrub cover, unless these scant species together add up to 10% or greater coverage. In this case, make a new species category called "<10%" on the line provided.

I. Dominant Tree Vegetation:



These are single-stemmed woody species >3 m tall that are often found on the periphery of marshes or in forested wetland habitats or swamps. Dominant tree types can include red maple, silver maple, black/red spruce, tamarack, and cedar.

Estimate the percentage of the dominant tree species. These values should sum to 100% unless the “No tree vegetation” box is checked. Do not include species that cover <10% of the total tree cover, unless these scant species together add up to 10% or greater coverage. In this case, make a new species category called "<10%" on the line provided.

J. Exposed Substrate:

The amount of available substrate can be important for species with different foraging and nesting requirements. The packed dirt or concrete from roads and trails also fall into this category.

Estimate the percentage of exposed mud, sand, rock, dirt, and concrete – anything that isn't vegetation or water. These values should sum to 100% unless the “No exposed substrate” box is checked.



Circle Map

This space is for sketching the main habitat characteristics to aid observers in coverage estimates. It is not necessary to complete.

APPENDIX 1: Safety First!

The survey should be an enjoyable and safe experience. Ultimately, safety is your responsibility, and if you are ever concerned about your safety during a survey, do not conduct the survey! Contact us if you have any concerns, and we'll see what we can do to make sure you are comfortable. Keep the following guidelines in mind:

General Survey Safety:

- Arrange a designated check-in time with a friend or relative who knows where you are
- Carry a flashlight, whistle, cell phone, and spare batteries
- Make sure the site is accessible in low-light conditions, and be conscious that heavy cloud cover in the early morning will reduce light for a longer period

Road Survey Sites:

- Wear bright or reflective clothing
- Be aware of traffic
- Park safely off the road
- Follow all traffic laws



APPENDIX 2: Reminders and Common Mistakes

Review your datasheets in the field:

Make sure to give yourself a minute at the end of each survey to ensure that each section of the datasheet is filled out to the best of your ability. If you're unsure about something, make a comment (this can be anywhere on the sheet if necessary). Feel free to get in touch if you have any questions.

Species codes:

There are several species that are commonly given the incorrect code; many of these are exceptions to the usual code rules. See Table 6:

TABLE 6. Species names with their correct AOU 4-letter code, and commonly used incorrect codes.

Species	Correct code	Incorrect code
Red-winged Blackbird	RWBL	RWBB
Canada Goose	CANG	CAGO
American Black Duck	ABDU	AMBD
Ring-necked Pheasant	RNEP	RNPH
Northern Shoveler	NSHO	NOSH
Tree Swallow	TRES	TRSW

Detected at Previous Point:

Observers sometimes neglect to indicate whether a Primary Species was detected at a previous point or not, which means we don't know if it's a unique individual. If you are unsure about whether it's a different individual, use your best guess and put a note in a comments section. It can be tough to judge!

Secondary Species:

Remember to count all individual secondary species in each 5-minute time block (0-5 minutes, 5-10 minutes, 10-15 minutes), and put in the number of each present in a 100m radius. When the next time block starts, count each individual as though you're seeing/hearing them for the first time.

Secondary Species Fly-throughs:

Each Secondary Species that flies by overhead without stopping to use the habitat in any way should be given their own row on the datasheet and indicated as a fly-through, even if that species already appears on the datasheet.

Habitat Survey Part D, % of Major Wetland Habitats within 100m:

This section is sometimes incomplete so that some habitat components are missing. This section is the most important part of the habitat survey, so please double check it is filled in!

APPENDIX 3: An Example of a Typical Bird Survey

In order to help you understand how to record your observations, a sample survey has been provided. Refer to the sample completed MMMP Bird Survey datasheet on page 27 as you read through this example to follow along with how you enter the information.

You've filled in your name, the study site (route name) and point ID, date, latitude, longitude, and visit number. This information can be filled out the night before you intend to survey. Leave the date empty until the day of the survey in case you have to postpone.

You have already arrived at your route and completed point 1, so you move on to Point 2. As you approach the point, you hear a Pied-billed Grebe faintly calling! In the Primary Species table under the “Species Code” column, write “PBGR” on the first row, and circle the “A” in the “Before Survey Period” column. You estimate the distance to the calling grebe to be greater than 100m, so check off the “Greater than 100m” box (in the distance category). You didn't have any grebes at your first point, so you circle “N” under “Detected at previous point”.



Next, you lay out your thermometer where it won't be in direct sunlight to give it time to acclimatize, and fill out the rest of the site information. After taking a moment to observe your station and surroundings, you estimate cloud cover to be five tenths. There is some fog so you fill in a 1 for the precipitation category, and because the leaves are rustling gently you classify the wind as a 2 (using the Beaufort Scale). Using a compass, or with help from the rising sun, you determine the wind is coming from the east. There is some distant traffic so you record the background noise as a 1. You finally check the thermometer; it reads 14 degrees C. Now that you are ready to begin, you record the start time on your sheet and press “play” on your speaker or mp3 player to begin the 15-minute survey. A double tone from the recording marks the beginning of the survey.

As the 5-minute pre-broadcast passive listening period begins, you quietly listen and scan the marsh for any birds. You are quickly rewarded; you hear an American Bittern calling to your left in the west, and then a second one but to your right. You proceed to write “AMBI” on the second and third line in the Primary Species table, and under the “Pass. min. 0-1, **beep**” column circle “A” for both individuals. You estimate that both bitterns are greater than 100m away so your check this distance category box. The first bittern, the one in the west, is coming from the same area where

Mary Ann Romito



you heard a bittern at your first point, so you circle “Y” under “Detected at previous point”. However the other bittern is new, so you circle “N”.

There is one lone Tree Swallow foraging within the 100m station area. As the swallow circles and catches insects out of the air, you write “TRES” on the first line of the Secondary Species table and mark a tally in the “min. 0-5” column. You can also check off Aerial Forager because you observed this individual catching insects; it’s actively using the habitat within the survey station. During this first minute you also hear an Alder Flycatcher singing and notice two Red-winged Blackbird males and 4 females that are calling on your right. Both these are also Secondary Species so you write “ALFL” on the second line and put a tick in the “min. 0- 5” column. On the third line you write down “RWBL” and tally just 2 in the “min. 0-5” column; remember we only record RWBL males because one male forms pair bonds with several different females and there are often too many females to follow. You also hear a Swamp Sparrow calling so you record the “SWSP” on the fourth line and tally 1.

Soon after, you hear a voice on the recording say “two”. This marks the start of minute 2 of the 5-minute pre-broadcast passive listening period (corresponding to the “Pass. min. 1-2, **min2**” column). The first American Bittern is still calling but the other one has gone quiet. Circle another “A” for the first individual, this time under the “Pass. min. 1-2, **min2**” column. You hear a Pied-billed Grebe, this time much closer so you judge it to be a new individual. You write down PBGR on the fourth line, circle the “A”, check off the “less than 50m” box, and circle “N” for previous point. During this period you hear a Bobolink; the first for you this season! On the fifth line of the secondary column you write down “BOBO” and include a tick in the first column (min. 0-5).

As time continues, you hear the voice on the recording say “three” and “four” and the first American Bittern is still calling; you circle an “A” under both these columns. During the fourth minute (“Pass. min. 3-4, **min4**”) the second bittern starts calling again; you circle another “A” in that column. You look up and with your binoculars spot an American Black Duck flying over! You can’t tell if it is a male or female at this distance, but that’s okay. You write down “AMBD” in the secondary species column and put a checkmark in the “Fly-through” column...then you realize you made a common mistake and the correct code is actually “ABDU”. You erase the error and put in the correct code.

Next you hear a voice say “five” for minute 4-5. Both bitterns are calling again so you circle 2 more “A”s in column “Pass. min. 4-5, **min 5**”. Halfway through this minute you hear a Sora off in the far distance, but it’s coming from the direction where you heard a Sora at your first point. You write “SORA” on a new row, circle “A” under the same column, check the greater than 100m box, and circle “Y” under “Detected at previous point”.



The broadcasted call of the Least Bittern marks the end of the 5-minute pre-broadcast passive listening period and the beginning of the 5-minute call broadcast period. Following the Least Bittern call broadcast, you can hear both American Bitterns still calling and circle 2 more “A”s in the “PBC. min. 5-6min, **LEBI**” column. The two Red-winged Blackbird males and the Swamp Sparrow that you recorded previously are still singing, so you mark 2 ticks in the RWBL row under the “min. 5-10” column and one in the SWSP row under the “min. 5-10” column. You notice another male Red-winged Blackbird singing to your left, so add another tick in the RWBL row under the “min. 5-10” column (for a total of 3 ticks). 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. You mark 4 ticks in the TRES box under the “min. 5-10” column; the Aerial Forager box is already checked from the first Tree Swallow.



Following the broadcast of the Nelson’s Sparrow during minute 6-7, you hear the Swamp Sparrow singing and another responds. You add another tick on the SWSP row under the “min. 5-10” column. You continue to hear the Bobolink and Alder Flycatcher so mark a tick each under the “min. 5-10” column. You also hear a Yellow Warbler! You add YEWA to the table and put a tick in the “min. 5-10” column. The first bittern is still calling so you circle another “A” under “PBC. min. 6-7, **NESP**”.

Following the call broadcast of the Virginia Rail during minute 7-8, that first American Bittern is still calling so you circle another “A”. You hear no other primary species in this minute but you do see a pair of Common Yellowthroats to your right. In the secondary species table, you add a COYE line and mark 2 ticks under the “min. 5-10 column”.

Following the broadcast of the Sora in minute 8-9, a Virginia Rail responds! This is your first one this morning. You write “VIRA” on the sixth line of the primary species table and circle “A” under



the “PBC. min. 8-9, **SORA**” column, and “N” for previous point. You estimate the VIRA is greater than 100m away. The Swamp Sparrow and Yellow Warbler continue singing, but you have already recorded them in this block.

During the Pied-billed Grebe call broadcast, the nearer grebe you heard earlier pops up directly in front of you, and starts calling! You circle “AV” in the “PBC. min. 9-10, **PBGR**” column. You hear no other primary species in this minute and the grebe disappears again. However, you see movement on the edge of the marsh and a quick scan with your binoculars reveals a female American Black Duck with 5 ducklings and a bit farther away a solo Ring-Necked Duck, a drake. Since the Black Ducks aren’t flyovers, they get a new row. You write ABDU and mark an H (for hen, or female duck) with 1 tick next to it, and a Y (for young) with 5 ticks, in the “min. 5- 10” column. Under that you put RNDU and mark D (for drake, or male duck) with 1 tick. You realize in the last survey you used F and M for female and male ducks, but that’s fine too.

You hear a single tone from the recording marking the start of the final 5-minute block of silent listening. During this last block you hear the Sora again and the first American Bittern starts back up! You circle 2 more “A”s under “Pass. min. 10-15”. You hear the Pied-billed Grebe from the previous minute again but can’t get a visual. You circle another “A”. The Tree Swallows have disappeared, but other secondary species are still calling: 1 Alder Flycatcher, 2 Swamp Sparrows, 1 Bobolink, 1 Yellow Warbler, and 2 Common Yellowthroats. You mark ticks for these individuals in the “min. 10-15” column. You also still see three male Red-winged Blackbirds and the Ring-necked Duck drake; the American Black Duck and her chicks have disappeared. You mark the ticks for the RWBL and RNDU.

You hear a double-tone from the recording, signalling the end of your survey at this station. Before you do anything else, you take a quick look at your sheet. Did you mark all the distances? Did you indicate previous point? The site and weather information is there? Good. You pack up, check around your feet to make sure you haven’t forgotten anything, and make your way to your next point.

Once you have completed all points on your route, it’s time to head home. You might want to take a nap right away, but first you let your check-in buddy know you made it home safe. Next, you take out your datasheets one more time and review the secondary species. As a double-check, you pull out your Bird Survey Code Sheet and ensure you have each species code correct. If a species does not appear on the reference sheet, write out the full name or double check on the Institute for Bird



Populations website (www.birdpop.org/docs/misc/Alpha_codes_eng.pdf). Then, summarize your ticks and write in the total number of individuals heard for each species for each time period. Neatly circle this number, or if you decide to copy your data into a new sheet because the original got too dirty or torn, just include the numeric max count for each time period.

When you finish all your surveys, by August 1st you either mail the originals to Birds Canada (remember to keep a copy for yourself as a backup!):

Maritimes Marsh Monitoring Program
PO Box 6227
17 Waterfowl Lane
Sackville, NB
E4L 1G6

or scan/snap photos of the sheets and email them to **Lachenbach@birdscanada.org**.

And finally, you pat yourself on the back for a job well done!

** See next page for the bird survey datasheet that is the result of your above observations! **



Maritimes Marsh Monitoring Program – Bird Survey Form

Observer: **Laura Achenbach** Study Site: **Tintamarre** Point ID: **MB34-02** Day: **27** Month: **05** Year: **19**

Latitude: **45.94743** Longitude: **-64.27498** Visit: **1** 2 3

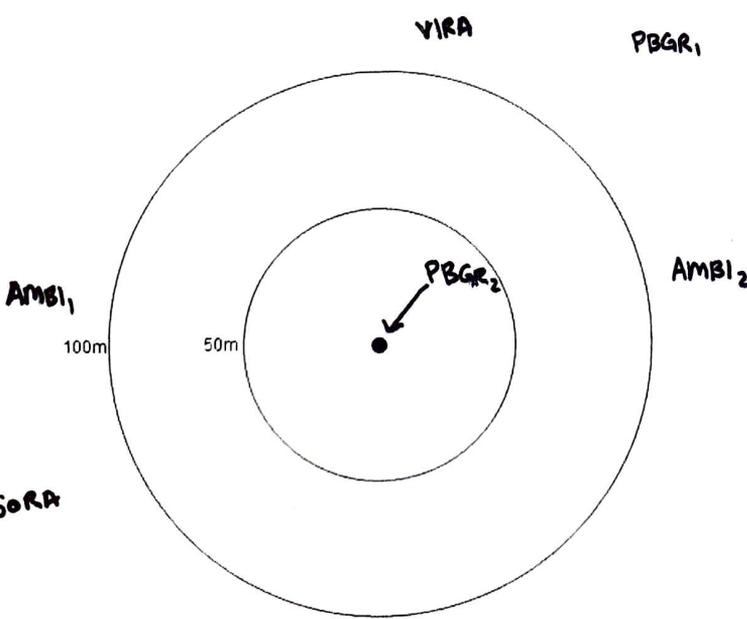
Start Time (24h): **05:34** Cloud Cover (10^{ths}): **5** Temperature (°C): **14** Precipitation Code (0-3): **1** Beaufort Wind Scale (0-6): **2** Wind Direction: **6** Background Noise (0-4): **1**

Primary Species:

American Bittern (AMBI)	Sora (SORA)	American Coot (AMCO)	Nelson's Sparrow (NESP)	Black Tern (BLTE)
Least Bittern (LEBI)	Virginia Rail (VIRA)	Common Gallinule (COGA)	Marsh Wren (MAWR)	Willet (WILL)
Pied-billed Grebe (PBGR)	Yellow Rail (YERA)	Am.Coot/C.Gallinule (GOOT)		

Species Code	Before Survey Period	Responded During: (A= Aural Detection, V= Visual Detection)											After Survey Period	Distance (choose one)			Detected at previous point (circle one)	Comments	
		Pass. min. 0-1 beep	Pass. min. 1-2 min2	Pass. min. 2-3 min3	Pass. min. 3-4 min4	Pass. min. 4-5 min5	PBC. min. 5-6 LEBI	PBC. min. 6-7 NESP	PBC. min. 7-8 VIRA	PBC. min. 8-9 SORA	PBC. min. 9-10 PBGR	Pass. min. 10-15		Within 50m	Between 50-100m	Greater than 100m			
PBGR ₁	(A)V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V				✓	Y (N)	
AMBI ₁	A V	(A)V	(A)V	(A)V	(A)V	(A)V	(A)V	(A)V	(A)V	A V	A V	(A)V	A V				✓	Y (N)	
AMBI ₂	A V	(A)V	A V	A V	(A)V	(A)V	(A)V	A V	A V	A V	A V	A V	A V				✓	Y (N)	
PBGR ₂	A V	A V	(A)V	A V	A V	A V	A V	A V	A V	A V	(A)V	(A)V	A V	✓				Y (N)	Came very close... so cool!
SORA	A V	A V	A V	A V	A V	(A)V	A V	A V	A V	A V	A V	(A)V	A V				✓	Y (N)	
VIRA	A V	A V	A V	A V	A V	A V	A V	A V	(A)V	A V	A V	A V	A V				✓	Y (N)	
	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V					Y (N)	
	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V					Y (N)	
	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V	A V					Y (N)	

Location on Point Count*:



Secondary Species:

Species Code	# Observed			Fly-through	Aerial Forager	Notes
	min. 0-5	min. 5-10	min. 10-15			
TRES	1 (1)	III (4)			✓	
ALFL	1 (1)	1 (1)	1 (1)			
RWBL	II (2)	III (3)	III (3)			
SWSP	1 (1)	II (2)	II (2)			
BOBO	1 (1)	1 (1)	1 (1)			
ABDU	1 (1)			✓		
YEWA		1 (1)	1 (1)			
COYE		II (2)	II (2)			Pair
ABDU		H:1 (1)				
RNDU		D:1 (1)	D:1 (1)			

APPENDIX 4: Example Habitat Survey Datsheet

Maritimes Marsh Monitoring Program – Habitat Survey Form

Observer(s) Laura Achenbach + Lucas Berrigan Study Site Tintamarre Point ID NB34-02 Day 07 Month 07 Year 19

Latitude 45.94743 Longitude -64.27498 Visit 1 2 3 Start Time (24h) 13:30

A. Wetland Type (check as many that apply)

Deep Marsh Bog Wet Meadow Treed Peatland/Swamp Coastal Wetland/Saltmarsh
 Shallow Marsh Fen Alder/Shrub Wetland Riparian Floodplain/Forest Coastal Plain

B. Wetland Modifier / Influence (check as many that apply)

Beaver Pond/Dam Channel/River Industrial Rock Shore Natural/Protected Area
 Impoundment Fish Ladder Agriculture Beach/Tidal Flat Sewage Lagoon
 Dykes/Berms Roadside/Trail/Boardwalk Urban/Residential Dune Pollution

C. Water Regime

Permanently Flooded (≥20% standing water) Saturated (<20% standing water) Seasonally Flooded Tidal

D. % of Major Wetland Habitats within 100m
 For the major habitat types listed, estimate the percent cover that occurs in the 100m survey radius.

Large patches of open water/floating plants			
EMERGENT herbaceous vegetation		20	
NON-EMERGENT herbaceous vegetation		60	
Shrubs		5	
Trees		15	
Exposed substrate (e.g. mud/sand/rock)		/	
Total (must sum to 100%)		100	

F. Dominant EMERGENT Herbaceous Vegetation
 Please describe the dominant species; those contributing 5% or more of the total emergent herbaceous vegetation cover. Sums of percentages must equal 100%. Use "other" for species not listed (identify) or to lump species making up <5% (identify as "<5%").

Emergent Grasses / Sedges / Wild rice			
Cattail / Rushes		10	
Reeds (<i>Phragmites/Phalaris</i>)		90	
Purple Loosestrife (<i>Lythrum</i>)			
Pickerelweed (<i>Pontederia</i>)/Arrowhead (<i>Sagittaria</i>)			
Horsetail			
Buckbean			
Yellow Sweet Clover			
Silverweed			
Cinquefoil			
Other: _____			
Total		100	
No emergent vegetation? (check box)			

E. Open Water and Dominant Floating Plants
 Please describe the amount of open water and/or the dominant species; those contributing 5% or more of the floating plant cover. Sums of percentages must equal 100%. Use "other" for species not listed (identify) or to lump species making up <5% (identify as "<5%").

Duckweed (<i>Lemna</i>)			
Pond-lily (<i>Nuphar</i>)		50	
Water Lily (<i>Nyphaea</i>)			
Pondweed (<i>Potamogeton</i>)			
Water-crowfoot (<i>Ranunculus</i>)			
Water Smartweed (<i>Polygonum</i>)			
Eelgrass (<i>Zostera</i>)			
Other: _____			
Open water		50	
Total		100	
No open water / floating plants? (check box)			

G. Dominant NON-EMERGENT Herbaceous Vegetation
 Please describe the dominant species; those contributing 5% or more of the total non-emergent herbaceous vegetation cover. Sums of percentages must equal 100%. Use "other" for species not listed (identify) or to lump species making up <5% (identify as "<5%").

Non-emergent Grass / Sedge		100	
Goldenrod (<i>Solidago</i>)			
Common Valerian			
Purple Vetch			
Fireweed (<i>Chamaenerion</i>)			
Other: _____			
Total		100	
No non-emergent vegetation? (check box)			

H. Dominant Shrubs

Please describe the dominant species; those contributing 10% or more of the total shrub vegetation cover. Sums of percentages must equal 100%. Use "other" for species not listed (identify) or to lump species making up <10% (identify as "<10%").

Alder			
Willow			
Dogwood			
Meadowsweet	10		
Labrador Tea			
Sweetgale			
Wild Rose (<i>Rosa</i>)			
Raspberry	10		
Blackberry			
Serviceberry sp. (<i>Amelanchier</i>)			
Bayberry (<i>Morella pensylvanica</i>)			
Huckleberry sp. (<i>Gaylussacia</i>)			
Other: <u>Rhodora</u>	80		
Total	1	0	0
No shrubs? (check box)			

I. Dominant Trees

Please describe the dominant species; those contributing 10% or more of the total tree cover. Sums of percentages must equal 100%. Use "other" for species not listed (identify) or to lump species making up <10% (identify as "<10%").

Red Maple			
Silver Maple			
Eastern White Cedar			
Tamarack			
Black Spruce			
Birch			
Aspen			
Other: _____			
Total	1	0	0
No trees? (check box)	<input checked="" type="checkbox"/>		

J. Exposed Substrate

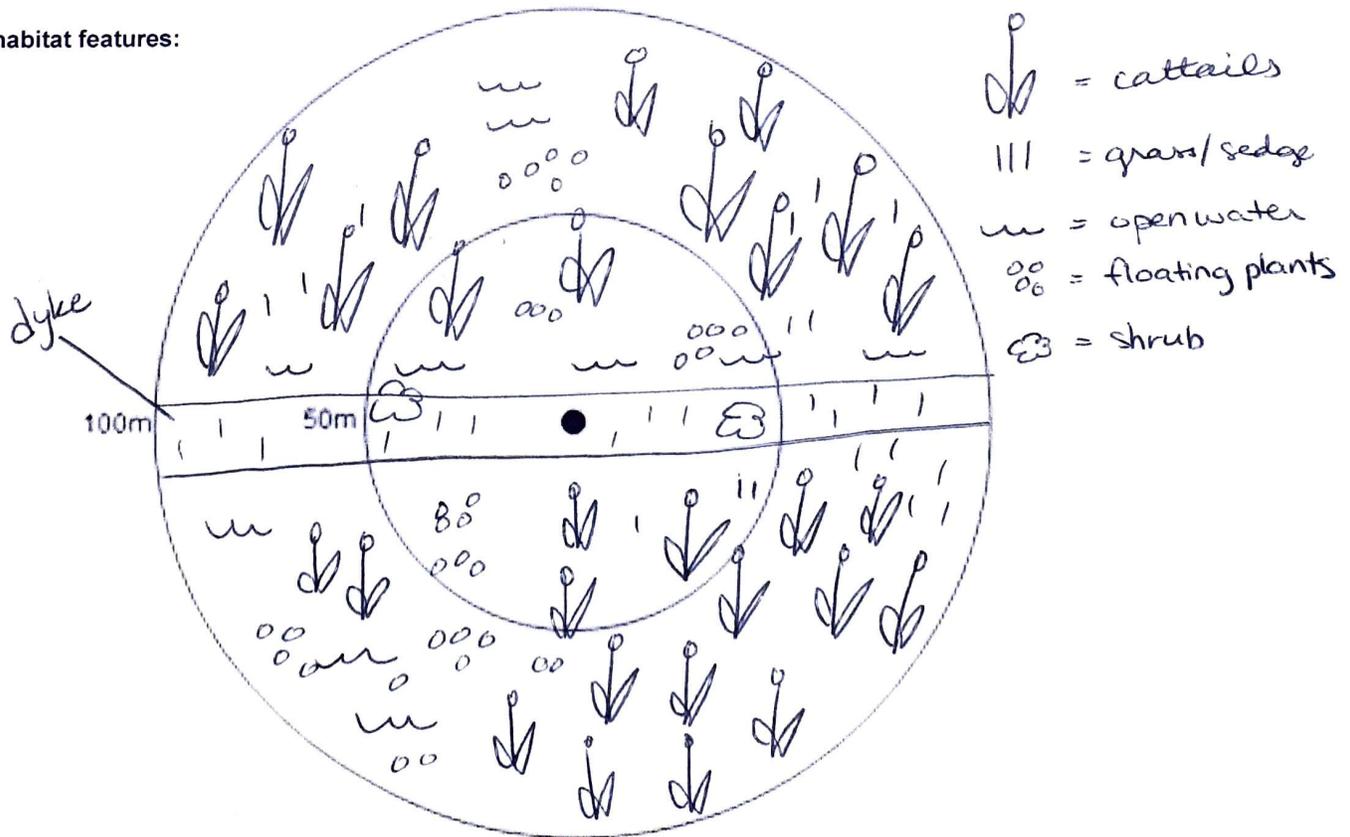
Please classify the substrate contributing to the exposed mud/sand/rock category. Sums of percentages must equal 100%.

Sand			
Mud/Soil			
Large Rocks (>10cm)			
Pavement			
Packed Dirt (road/trail)			
Total	1	0	0
No exposed substrate? (check box)	<input checked="" type="checkbox"/>		

Comments

Difficult to see open water due to cattails, used satellite imagery to help gauge coverage

Sketch of key habitat features:



APPENDIX 5: Our Partners and Funders

The Maritimes Marsh Monitoring Program would like to recognize the many and varied contributions from the below organizations, also including:

Naturalist clubs of the Maritimes
CFB Gagetown

This project was undertaken with the financial support of the Government of Canada.
Ce projet a été réalisé avec l'appui financier du gouvernement du Canada.

