Brier Island
Bird Migration Research Station
-
Field Protocol

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1. Introduction

This document was adapted by Lance Laviolette from the McGill Bird Observatory Field Protocol for Migration Monitoring Program by Marcel A. Gahbauer and Marie-Anne R. Hudson, November 2008.

Brier Island Bird Migration Research Station (BIBMRS) was established in 1976 on property owned by Acadia University at Brier Island, Nova Scotia. The station has operated annually since then and more than 50,000 birds of over 110 species have been banded. Birds banded at the station have been recovered at many locations in eastern North America, in Brazil and on islands in the Caribbean. The number of birds banded also contributes to the calculation of an annual, regional population index.

To conserve and protect bird species, we need to monitor their populations. Many observers have noted a decline in bird populations in eastern Canada but it is not possible to indicate how much they have declined through casual observations alone. The most widespread monitoring program in North America, the Breeding Bird Survey (BBS) that counts birds every summer on their breeding grounds, has confirmed this trend. Unfortunately, the BBS is limited to areas accessible by road. Thus, the BBS provides very little information on population trends of birds breeding in non-accessible areas of the Maritimes and the boreal forest.

The value of bird banding as a research tool in avian ecology is well documented (e.g., many research articles using data from banding can be found in peer reviewed journals such as Journal of Field Ornithology, Auk, Wilson Bulletin, etc.). Fall banding (post breeding season) provides a means of measuring the volume of birds moving south through concentration points such as Brier Island. Studies have shown the origin of these birds is from a wide geographic range, particularly the Boreal and Maritime forests (Dunn *et al* 2006).

Consistent long-term monitoring minimizes fluctuations in the number of birds counted due to factors other than population changes (e.g. weather, poor breeding season, and eruptive population cycles). Since annual, quantifiable efforts began in 1976 on Brier Island, data suggests that the population of a number of migrants has diminished while others are stable or growing. It is important that this information continues to be gathered and that population trends continue to be monitored in a standardized manner (Dunn and Hussell 1995, Dunn 2005).

The BIBMRS field protocol is intended to ensure that personnel follow the same operating procedures on a daily basis and from year to year. Hussell and Ralph (1998) provides the current recommended field methods for population monitoring of landbird migrants and was produced as a result of a workshop jointly organized by the Canadian Wildlife Service (CWS) and the U.S. Fish and Wildlife Service.

For the first six year of its history, the station operated throughout the fall migration period, from early August until late October. Beginning in 2003, BIBMRS began operating according for a period of approximately three weeks in the fall, between August 12 and September 12.

In 2006, a 17th net (NP5) was added to the standard operation. This protocol applies to the period of time after this 17th net was added.

Efforts to conduct spring banding were hampered by the frequent occurrence of heavy fog and were abandoned after several attempts.

2. Goals

The goals of the Brier Island Bird Migration Research Station (BIBMRS) are as follows:

1. To provide quality data to the Canada-wide effort to determine what changes are taking place in populations of migratory passerine species and,
2. To document avian migration at the station and the surrounding area.

The primary method of attaining these goals will be through the standardized operation of mist nets. A count of migrant birds will be produced based on the number of birds caught. Yearly counts can be compared, providing a long-term, population trend for each species.

3. Staffing

All staff at BIBMRS are volunteers.

BIBMRS can be run by three people so long as they have extensive experience with banding, with migration patterns at the site, and with the BIBMRS protocol. Familiarity with site migration is critical because of the potential for large migration events that may require rapid decision making to adapt the operating procedure to the situation (see section 8 - Operations). At least one of the three individuals must possess a valid Banding Permit and be capable of acting as a Bander in Charge (BIC). The BIC is in charge of the day's operations and makes the final decisions regarding these operations. In addition, at least one individual, who may also be the BIC, should be competent at identifying birds by sight and sound.

To accommodate most levels of bird migration (Operations), it is preferable that in addition to the three experienced people, there be at least two people skilled in mist-net extractions and one person to act as a scribe. Under these conditions, net extraction is undertaken by teams comprised of two or three people.

If insufficient people are available on a particular day to run the full protocol (i.e. to run all net groups), the number of net groups run will be adjusted accordingly (Operations).

If no one is qualified to act as a BIC then the station will not operate. A Daily log form (Appendix 3) will be completed indicating this.

4. Study Area

The station is located at Northern Point, Brier Island, Digby County, Nova Scotia (44º 16’ 48” N, 66º 20’ 45” W) (Figure 1).

Figure 1 – Location of Brier Island, Nova Scotia

The station is situated at the northern end of Brier Island (Figure 2). The vegetation type is coastal forest and is influenced by cool, moist climate conditions and exposure associated with the Bay of Fundy shore.

Figure 2 – Location of Brier Island Bird Migration Research Station

The area encompassing the nets is mid-successional and has an overstory dominated by white spruce with a component of speckled alder. Strong winds, salt spray and harsh climatic conditions limit the canopy structure and the rate of succession. The more exposed areas are covered with ground juniper, bayberry, wild rose and blueberry.

An old field is found within the boundaries of the station (Habitat Management). Goldenrod, grasses, blackberry, wild rose and Himalayan Balsam are the dominant plant species.

BIBMRS has no permanent buildings. There are tarpaulins erected for protection from the sun and rain but these are open sided. The table where banding takes place is in the open air so care must be taken at all times to ensure that birds are sheltered from direct sun or from excessive moisture.

5. Net Locations

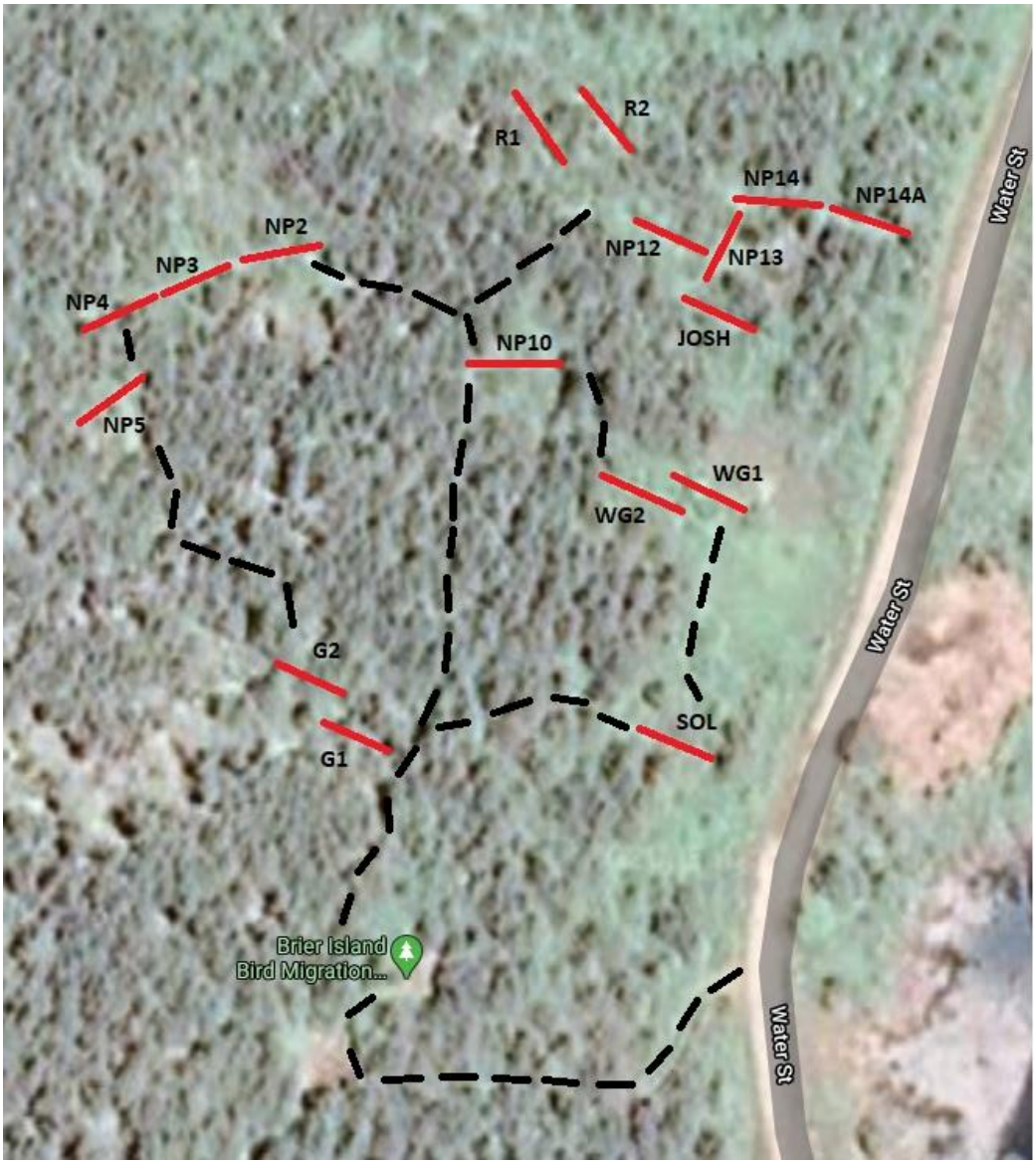

Figure 3– Brier Island Bird Migration Research Station Net Locations

There are 17 nets setup at standard locations (Figure 3). Figure 4 provides the latitude and longitude of each net pole of each net.

Position of each net pole	Latitude	Longitude
G-1	44.2839	-66.3438
G-1B	44.2840	-66.3439

G-2	44.2841	-66.3440
G-2B	44.2840	-66.3441
JOSH	44.2846	-66.3431
JOSH-B	44.2846	-66.3430
NP-10	44.2845	-66.3435
NP-10B	44.2845	-66.3434
NP-12	44.2847	-66.3432
NP-12B	44.2847	-66.3431
NP-13	44.2847	-66.3431
NP-13B	44.2848	-66.3430
NP-14	44.2848	-66.3429
NP-14-A	44.2847	-66.3427
NP-14-AB	44.2847	-66.3427
NP-14B	44.2847	-66.3428
NP-2	44.2847	-66.3440
NP-2B	44.2847	-66.3438
NP-3	44.2846	-66.3442
NP-3B	44.2847	-66.3440
NP-4	44.2846	-66.3443
NP-4B	44.2846	-66.3442
NP-5	44.2845	-66.3443
NP-5B	44.2844	-66.3444
R-1	44.2849	-66.3434
R-1B	44.2849	-66.3435
R-2	44.2848	-66.3432
R-2B	44.2849	-66.3433
SOL	44.2840	-66.3431
SOL-B	44.2840	-66.3432
WG-1	44.2843	-66.3430
WG-1B	44.2844	-66.3431
WG-2	44.2844	-66.3433
WG-2B	44.2843	-66.3431

Figure 4– Latitude and Longitude of each net pole

These nets are allocated into the following groupings:

Group 1 – Solitary (SOL), Wick's Garden 1 & 2 (WG1 & WG2)
Group 2 – Green 1 & 2 (G1 & G2), North Point 2, 3, 4, 5, 10 (NP2, NP3, NP4, NP5 & NP10)
Group 3 – Ross 1, Ross 2 (R1, R2)
Group 4 – Joshua, North Point 12, 13, 14 & 14A (NP12, NP13, NP14, NP14A, JOSH)

Each of these groups is in the form of a small circuit and all nets should be opened or closed as a unit unless other factors such as weather (Operations) prevent this from occurring.

Group 1 nets are located along the edges of a small old field and garden area rather than in the open field itself. The vegetation surrounding these nets is low speckled alder and small white spruce with areas of blackberry and wild rose. The area is bounded on the east by a gravel road and on the other three sides by taller white spruce.

Group 2, 3 & 4 nets are located in areas of more mature white spruce interspersed with speckled alder. NP 2-5 are situated along the central ridge of the island, about 23 meters above seas level.

All nets are four-shelf tethered polyester with 30 mm mesh. They are 12 meters long and deployed to a height of about 2.6 m. All nets in use are Japanese made and are purchased through Avinet Research Supplies. Efforts should be made to remain consistent with the use of Avinet Research Supplies when additional nets are purchased, as the capture rate varies by model.

Opening and closing times for each net are recorded by the BIC on the log sheet (Appendix 4). The net where a bird is captured is recorded on the data sheets (Appendix 1).

All the above nets have always been in the same location. NP5 was only added to the suite of nets in 2006.

6. Operations

a. General

Currently BIBMRS is operating for a three-week period between the dates of August 12 to September 12 inclusive. Start and end dates vary between years, but every effort should be made to include August 20 through September 7. These dates have been covered most consistently across all years.

The order of operations is:

a. BIC determines which nets are to be opened and the appropriate nets are opened.
b. Net opening (To the nearest half hour) and weather data is logged by the BIC (Record Keeping, Appendix 3 and Appendix 4).
c. Banding Protocol is carried out (see below).
d. Open nets are closed and the closure times are logged by the BIC (Appendix 4).
e. Incidental bird sightings of significance are recorded (Appendix 3).

The BIC is responsible every morning for determining which nets are to be opened initially and remain open throughout the day. The BIC should regularly speak with all other volunteers to determine if net operations should be modified. In all cases, the nets will be operated in a manner that minimizes risk to the birds that may be captured.

For migration monitoring, all net groups are opened prior to sunrise and closed at 1pm unless the BIC determines otherwise. While the daily length of net effort will decrease as the fall season advances, the 1pm closing time is selected because bird movement has slowed significantly by this time.

Individual nets or groups of nets may be closed earlier or may not be opened initially at the discretion of the BIC due to the following factors.

a. Weather
    i. Individual or groups of nets may be closed or may not be opened due to strong wind. Many nets are located in fairly sheltered locations so which nets may be affected, if any, will be determined by the wind direction and strength.
    ii. The station's location on the island often shelters most of the nets from the effects of fog, even when it is very heavy over the rest of the island. Fog that is at the height of the tops of the spruce trees may only result in one or two nets being closed while a heavy, ground level fog will prevent the opening of any nets. Any appreciable condensation of fog on a net should be cause for its closure.
    iii. Rain is cause for all nets to be closed or to remain closed.
b. Staffing
    i. If there are less than six people to perform operations at the station (Staffing) the number of nets initially opened may be reduced.
    ii. If the volume of birds may overwhelm the capabilities of the team of volunteers available on a given day, the number of nets initially opened may be reduced.

c. Level of Migration Activity
This is the most difficult aspect of the station operations to predict. While large migratory movements can be anticipated for some weather patterns, notably northwest winds following the passage of a cold front, there is never 100% certainty that they will or will not happen. As such, the BIC must be ready to modify what nets are open if the migration level changes.

Generally, this means restricting the number of nets initially opened when the possibility of a large migratory movement is high (This also depends on the number of volunteers on hand) or closing groups of nets if there is a sudden, unexpected 'fallout' of birds. However, it also means opening any closed nets when it is determined that there is not a large movement or a movement has abated.

d. Predation
BIBMRS has been fortunate in that there are no terrestrial predators that interact with birds in the nets. In addition, there are few avian predators that occur in the area during the current operating period. This risk increases if the time of operation extends into the latter part of September when raptor migration peaks. However, the BIC must always be ready to react to any occurrence of raptors in the area, either by increasing the frequency of net checking and/or by the closure of nets.

The full suite of nets is operated unless there are extraordinary circumstances as detailed above. Net opening priority is Group 1, then Group 2, then Group 3 and then Group 4. If groups must be closed, this should be done in the reverse order to the priority.

All net openings and closings are recorded on the net log sheet.

When nets are opened, caution is taken to ensure that the bottom pocket hangs 15-20cm above the ground.

b. Banding Protocol

Nets are checked at least every 30 minutes. If there has been raptor movement observed near the station then the frequency is increased to every 15 minutes.

Birds that are extracted from the nets are carried back to the banding site in paper bags. Upon reaching the banding station they are suspended from an elastic clothesline and the net location is marked using clothespins. Newly returned bags with birds are kept separate from those already on the clothesline to prevent captivity beyond one hour (see below).

BIBMRS adopted the use paper bags for transporting and holding birds due to a number of factors:

a. Paper bags are easily obtained in bulk and easily recycled.
b. Paper bags generally maintain their shape when in use which prevents constriction upon a bird.
c. Given that banding is conducted outdoors at BIBMRS, conditions are often damp in the early morning. If a paper bag becomes excessively damp it will tear. While

this may result in a bird escaping, this is preferable to the bird being encompassed in wet cloth and suffering from hypothermia.

d. There is often no facility available to wash cloth bags on Brier Island.
e. Paper bags are single use, removing the risk of disease transmission between birds.
f. The source net locations and other information such as 'already banded' may be written on the bag if desired.

Birds are kept at the banding station no more than one hour after which the species will be recorded and the bird will be released unbanded. If the backlog of birds will exceed this time, the BIC must take steps to reduce the backlog. This may be done by reducing the number of open nets as described above or adding an additional team of banders.

The handling of birds is a privilege not an inherent right. Volunteers are not permitted to undertake bird handling, extraction from mist nets or banding until they have been properly trained and are approved to do so by the BIC (Training).

The information routinely obtained for each bird captured is shown below:

a. band number
b. species
c. age
d. sex
e. unflattened wing chord (to the nearest half millimeter)
f. weight (to the nearest tenth of a gram) (two measurements: bird in bag and empty bag). The calculation for Total (bird in bag – empty bag) is to be done when records are entered into the computer.
g. date
h. time of banding (To the nearest 'previous' half hour).
i. net in which the bird was captured
j. comments if any (Any additional relevant information e.g. molt, deformities)

This information is recorded on the Banding Record Sheet (Appendix 1).

If the backlog is getting too long, items e, f, h and I may be omitted until such time as the backlog is relieved.

The standard banding references are Pyle (1997) and Pyle (2008).

Banders should routinely check for cloacal protuberance and brood patch and should always attempt to age individuals.

The regular set of measurements is taken for retrapped birds (Appendix 2). Retrapped birds are those that already have a band. These can be birds from another station or birds previously banded by BIBMRS, including those birds banded or recaptured the same day. The exceptions to this are newly fledged BTNW and newly fledged GCKI that have been banded. They are to be released near the net in which they were caught. Recently fledged birds are those that have no formative plumage in the crown.

7. Record Keeping

It is the responsibility of the BIC to ensure that all records are kept accurately.

The operations procedure is described in the section above (Operations) and samples of the completed log sheets are included in the Appendices (Appendix 3 and Appendix 4).

Daily banding totals and any other information required to be sent by CMMN members to Birds Canada will be entered into Birds Canada software and submitted by the BIC by the end of each calendar year.

Temperature is to be recorded to the nearest degree Celsius. Wind speed is to be determined using the information described in Figure 5.

Force Number	Description	Signs	km/hr
0	Calm	Smoke rises	0-1
1	Light air	Smoke drifts but no wind vane movement	2-5
2	Slight breeze	Wind felt on face; leaves rustle	6-11
3	Gentle breeze	Leaves and twigs in constant motion; wind extends a light flag	12-19
4	Moderate breeze	Dust and loose paper are raised; small branches are moved	20-28
5	Fresh breeze	Small trees and leaves begin to sway	29-38
6	Strong breeze	Large branches in motion; whistling in wires	39-49
7	High wind	Whole tree in motion	50-61

Figure 5 – Beaufort Scale for Wind Speed

Currently there is no formal census conducted. Monitoring is undertaken using mist-netting results only. Daily Banding Totals (DBT) consist of new captures (new bandings + released unbanded + mortalities + foreign recaptures).

8. Habitat Management

Monitoring vegetation and documenting site conditions generate important background information on bird-habitat associations and habitat changes that may alter the numbers and species of birds present at a given site.

The goal of habitat management at BIBMRS is to maintain the habitat in the area surrounding the net lanes in an historically consistent state. This is a mid-successional state (Study Area) where the majority of the vegetation height does not exceed the height of the nets.

Habitat monitoring through photographic records of site conditions is to be carried out at least once every five years. Photographs should be taken from the northern most or western most end of each net (Figure 3). A table with the GPS coordinates and net orientation will be added to this protocol after the site is next visited.

Each photo will be named in the format NNNNNNDDMMYYYY-BIBMRS where NNNNNN is the net lane abbreviation and DDMMYYYY is the date on which the photo was taken. Photos will be stored in a folder with a name in the format Net Photos YYYY BIBMRS where YYYY is the year they were taken. In the year photographs are taken, they will be submitted to Birds Canada for archiving along with submission of annual data.

The most recent photographs should be assessed annually to determine what habitat maintenance should be carried out.

Ongoing habitat maintenance should be carried out as needed during the fall migration monitoring seasons. Chainsaws, gas trimmers, pruning saws and hand clippers are to be used to:

a. Clear the net lanes and foot paths to facilitate the erection of and attendance to nets.
b. Cut up trees and large branches that have fallen across the net lanes or foot paths.
c. Remove those portions of white spruce and speckled alder that have grown above the net height.
d. Thin the density of the surrounding vegetation.

Around the nets, vegetation should be trimmed back approximately one meter from the net, to the height of the nets (just over 2.6 m). In strong winds, the nets should be able to billow straight out without catching on any twigs, branches, or leaves.

9. Training

Bird handling and extraction from mist nets are delicate processes that require training and practice. All persons wanting to volunteer at BIBMRS are vetted by the BIC. This process is individualized, but starts with the prospective volunteer self-assessment and then and evaluation by the BIC and trained personnel of these stated abilities. This evaluation will determine where training needs to start. Here is the training sequence to follow:

1. The volunteer is trained to identify the most common species.
2. The volunteer is taught how to handle and release birds. Once this has been mastered to the satisfaction of the trainer/BIC, the volunteer will be invited to learn how to extract a bird from a mist net.
3. The volunteer accompanies an experienced trainer to a mist net to observe and discuss bird extraction.
4. The volunteer is presented with simple extractions (determined by the trainer) on which to practice extraction techniques.
5. When the trainer is satisfied that the volunteer shows proficiency with the basic extraction techniques, the volunteer can begin to select their own candidate birds. The trainer is present to answer questions and assist as required.
6. The volunteer will be provided with more complex extractions at the discretion of the trainer.
7. Volunteers are always paired with more experienced extractors for at least the first three years.

If the volunteer cannot be trained to extract birds to the satisfaction of the trainer or BIC they will not be permitted to do so.

10. The Banders Code of Ethics

BIBMRS and its volunteers adhere to the Banders Code of Ethics adapted from the 'North American Banders Study Guide'.

1. More than anything else, banders are responsible for the safety and welfare of the birds they study. This means that stress and risks of injury or death need to be minimized. Some basic rules are as follows:
    a. Handle each bird carefully, gently, quietly, and with respect
    b. Capture and process only as many birds as you can safely handle
    c. Modify operations accordingly when there are predators in the area
    d. Do not band in inclement weather
    e. Frequently assess the condition of nets and repair them as required
    f. Trainees must be properly trained and supervised
    g. Check nets every 20-30 minutes
    h. Properly close all nets at the end of the banding day
    i. Do not leave nets set and untended
    j. Only double bag non aggressive birds of the same size and species and only when absolutely necessary
    k. Use the correct band size and banding pliers for each bird
    l. Treat all bird injuries in the most humane way
2. Banders must continually assess their own work to ensure that it is beyond reproach.
    a. Reassess methods and your approach whenever an injury or mortality occurs
    b. Accept constructive criticism from other banders
3. Banders must offer honest and constructive assessment of other's work to maintain the highest standards possible.
    a. Publish innovations in banding, capture and handling techniques
    b. Educate prospective banders and trainers
    c. Provide feedback of any instances of mistreatment of birds to the bander
    d. If there is no improvement, then file a report with the banding office
4. Banders must ensure that the data gathered are accurate and complete.
5. Banders must obtain permission to band on private property.
6. If injuries and casualties are occurring, it is imperative that the BIC determine the cause and modify operating procedures as required.
7. Banders must continually observe ethical procedures, and recognize the privilege of handling birds.

11. Record of Changes or Major Interruptions in Standardized Data Collection

Protocol changes or interruptions to operations will be recorded in the table below if they are likely to have affected the consistency of the long-term data set. The purpose is to alert researchers to issues that may affect the appropriate use and interpretation of the data set. Examples include change in operational dates or daily hours of coverage, or gaps of a week or more in coverage (e.g. due to lack of personnel or site access).

If appropriate, the section of the protocol affected will be referenced (e.g. section number, altered locations on a map, new GPS points). Revise the 'latest version' date on page 1 of this protocol. If changes have been made to the protocol other than adding to the table below, submit a copy of the entire revised protocol to Birds Canada along with year-end data submission; otherwise, send only a copy of the table.

Date	Description of change and justification (if applicable)
2020 and 2021	COVID prevented standardized station operation

12. Acknowledgements

We would like to thank Marcel Gahbauer and Marie-Anne Hudson for writing the McGill Bird Observatory Field Protocol for Migration Monitoring Program upon which this document is based. We would also like to thank Andrée Dubois-Laviolette and Peter Comeau for their invaluable comments during the writing of this document. Last but definitely not least, we would like to thank the many volunteers without whose participation BIBMRS would cease to operate.

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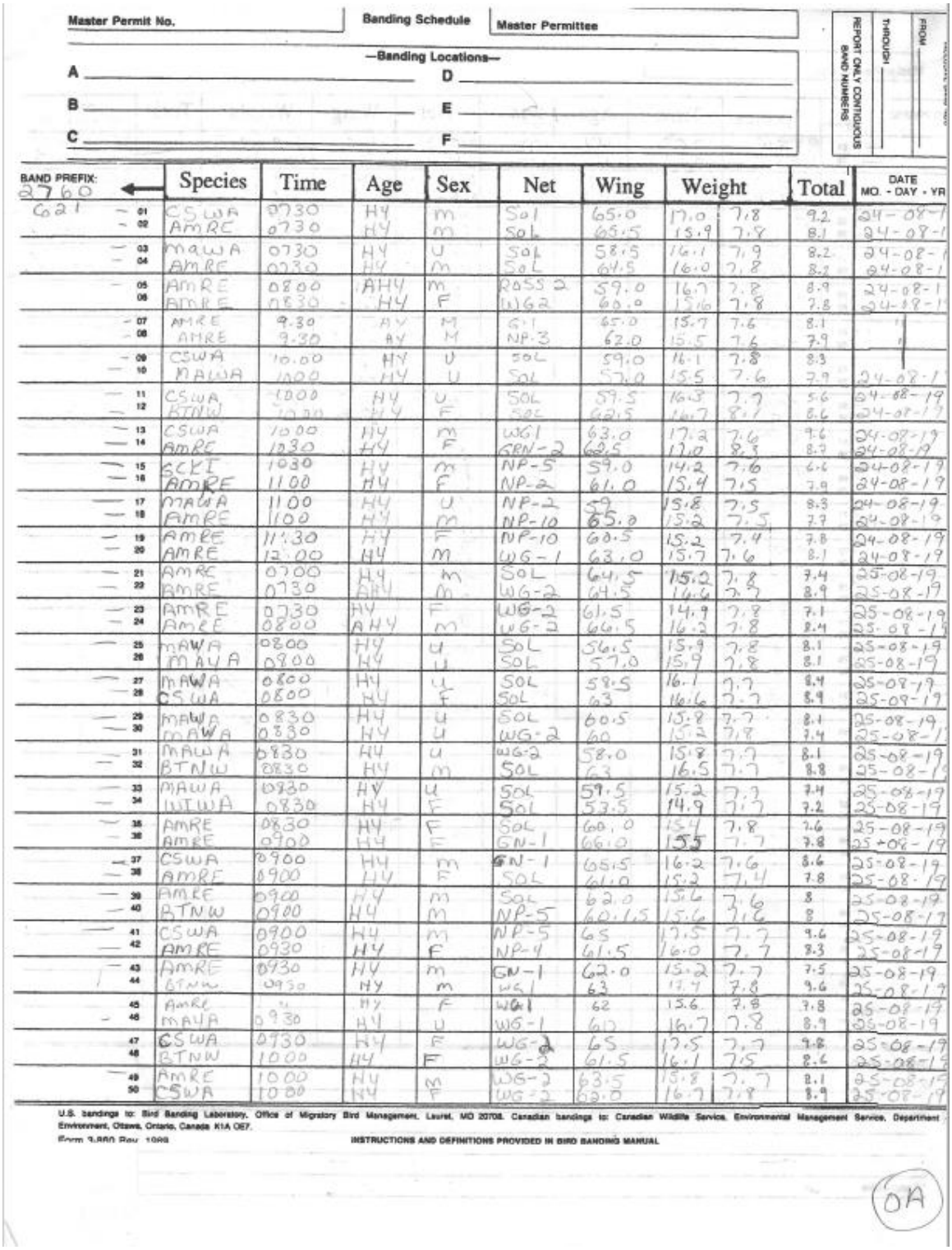
Appendix 1 – Banding Record Sheet, Side 1



Master Permit No. | Banding Schedule | Master Permittee

—Banding Locations—

A _____ D _____

B _____ E _____

C _____ F _____

REPORT ONLY CONTIGUOUS BAND NUMBERS — FROM _____ THROUGH _____

BAND PREFIX: 2760 621

	Species	Time	Age	Sex	Net	Wing	Weight		Total	DATE MO. - DAY - YR
01	CSWA	0730	HY	m	Sol	65.0	17.0	7.8	9.2	24-08-19
02	AMRE	0730	HY	m	Sol	65.5	15.9	7.8	8.1	24-08-19
03	MAWA	0730	HY	U	Sol	58.5	16.1	7.9	8.2	24-08-19
04	AMRE	0730	HY	m	Sol	64.5	16.0	7.8	8.2	24-08-19
05	AMRE	0800	AHY	m	ROSS 2	59.0	16.7	7.8	8.9	24-08-19
06	AMRE	0830	HY	F	WG2	60.0	15.6	7.8	7.8	24-08-19
07	AMRE	9.30	AY	M	G-1	65.0	15.7	7.6	8.1	"
08	AMRE	9.30	AY	M	NP-3	62.0	15.5	7.6	7.9	"
09	CSWA	10.00	HY	U	SOL	59.0	16.1	7.8	8.3	"
10	MAWA	1000	HY	U	SOL	57.0	15.5	7.6	7.9	24-08-19
11	CSWA	1000	HY	U	SOL	59.5	16.3	7.7	8.6	24-08-19
12	BTNW	1030	HY	F	SOL	62.5	16.7	8.1	8.6	24-08-19
13	CSWA	1000	HY	m	WG1	63.0	17.2	7.6	9.6	24-08-19
14	AMRE	1030	HY	F	GRN-2	62.5	17.0	8.3	8.9	24-08-19
15	SCKI	1030	HY	m	NP-5	59.0	14.2	7.6	6.6	24-08-19
16	AMRE	11.00	HY	F	NP-2	61.0	15.4	7.5	7.9	24-08-19
17	MAWA	1100	HY	U	NP-2	59	15.8	7.5	8.3	24-08-19
18	AMRE	1100	HY	m	NP-10	65.0	15.2	7.5	7.9	24-08-19
19	AMRE	11:30	HY	F	NP-10	60.5	15.2	7.4	7.8	24-08-19
20	AMRE	12.00	HY	m	WG-1	63.0	15.7	7.6	8.1	24-08-19
21	AMRE	0700	HY	m	SOL	64.5	15.2	7.8	7.4	25-08-19
22	AMRE	0730	AHY	m	WG-2	64.5	16.6	7.7	8.9	25-08-19
23	AMRE	0730	HY	F	WG-2	61.5	14.9	7.8	7.1	25-08-19
24	AMRE	0800	AHY	m	WG-2	66.5	16.2	7.8	8.4	25-08-19
25	MAWA	0800	HY	U	SOL	56.5	15.9	7.8	8.1	25-08-19
26	MAWA	0900	HY	U	SOL	57.0	15.9	7.8	8.1	25-08-19
27	MAWA	0800	HY	U	SOL	58.5	16.1	7.7	8.4	25-08-19
28	CSWA	0800	HY	F	SOL	63	16.6	7.7	8.9	25-08-19
29	MAWA	0830	HY	U	SOL	60.5	15.8	7.7	8.1	25-08-19
30	MAWA	0830	HY	U	WG-2	60	15.2	7.8	7.4	25-08-19
31	MAWA	0830	HY	U	WG-2	58.0	15.8	7.7	8.1	25-08-19
32	BTNW	0830	HY	m	SOL	63	16.5	7.7	8.8	25-08-19
33	MAWA	0830	HY	U	SOL	59.5	15.2	7.7	7.4	25-08-19
34	MAWA	0830	HY	F	SOL	53.5	14.9	7.7	7.2	25-08-19
35	AMRE	0830	HY	F	SOL	60.0	15.4	7.8	7.6	25-08-19
36	AMRE	0900	HY	F	GN-1	66.0	15.5	7.7	7.8	25-08-19
37	CSWA	0900	HY	m	GN-1	65.5	16.2	7.6	8.6	25-08-19
38	AMRE	0900	HY	F	SOL	61.0	15.2	7.4	7.8	25-08-19
39	AMRE	0900	HY	m	SOL	62.0	15.6	7.6	8	25-08-19
40	BTNW	0900	HY	m	NP-5	60.5	15.6	7.6	8	25-08-19
41	CSWA	0900	HY	m	NP-5	65	17.5	7.7	9.6	25-08-19
42	AMRE	0930	HY	F	NP-4	61.5	16.0	7.7	8.3	25-08-19
43	AMRE	0930	HY	m	GN-1	62.0	15.2	7.7	7.5	25-08-19
44	BTNW	0930	HY	m	WG1	63	17.7	7.8	9.6	25-08-19
45	AMRE	"	HY	F	WG1	62	15.6	7.8	7.8	25-08-19
46	MAWA	0930	HY	U	WG-1	60	16.7	7.8	8.9	25-08-19
47	CSWA	0930	HY	F	WG-2	65	17.5	7.7	9.8	25-08-19
48	BTNW	1000	HY	F	WG-2	61.5	16.1	7.5	8.6	25-08-19
49	AMRE	1000	HY	m	WG-2	63.5	15.8	7.7	8.1	25-08-19
50	CSWA	1000	HY	F	WG-2	62.0	16.7	7.8	8.9	25-08-19

U.S. bandings to: Bird Banding Laboratory, Office of Migratory Bird Management, Laurel, MD 20708. Canadian bandings to: Canadian Wildlife Service, Environmental Management Service, Department Environment, Ottawa, Ontario, Canada K1A 0E7.

Form 3-800 Rev. 1988 — INSTRUCTIONS AND DEFINITIONS PROVIDED IN BIRD BANDING MANUAL

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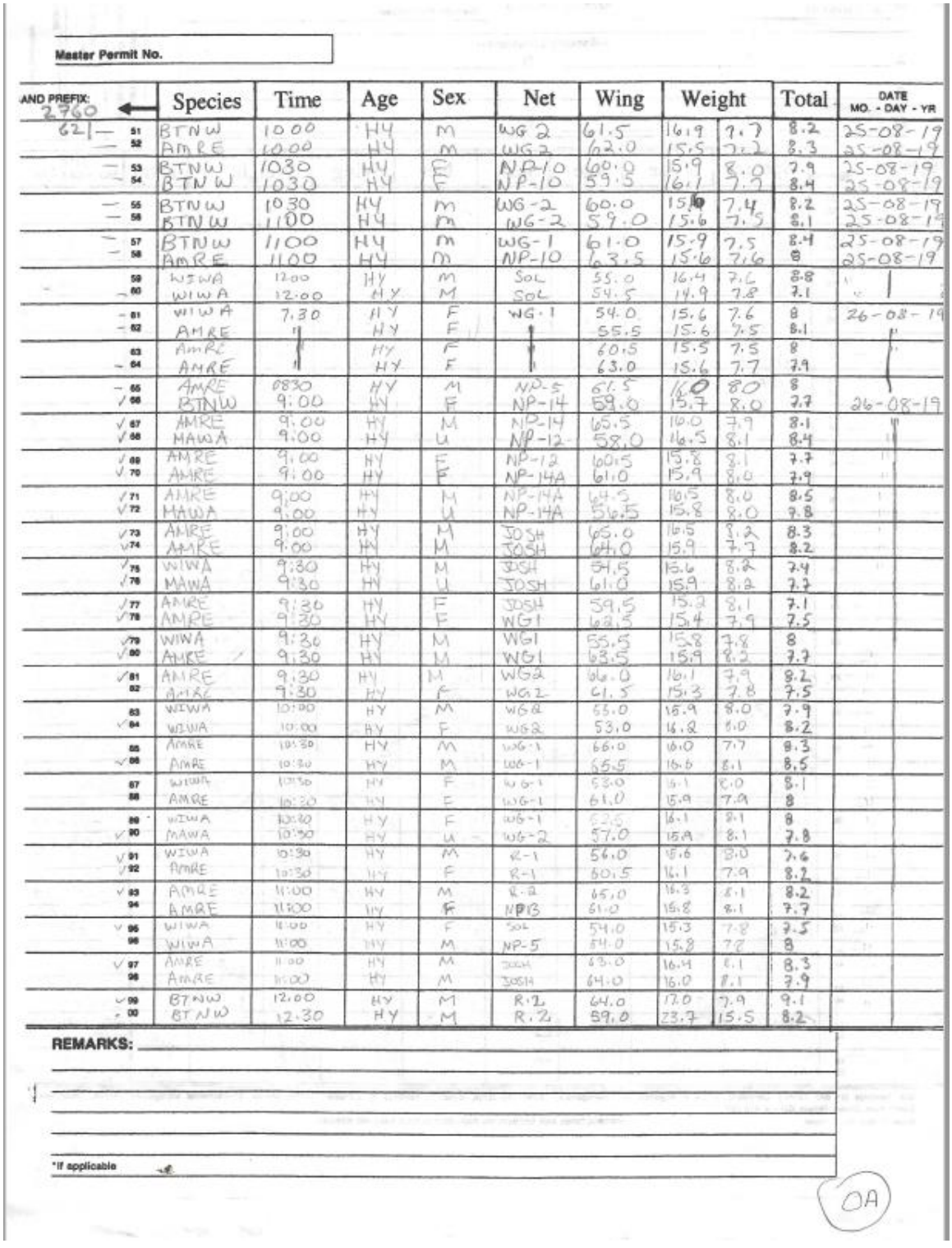
Appendix 1 cont'd – Banding Record Sheet, Side 2



Master Permit No.

AND PREFIX: 2760	Species	Time	Age	Sex	Net	Wing	Weight		Total	DATE MO. - DAY - YR
621 — 51	BTNW	1000	HY	M	WG 2	61.5	16.9	7.7	8.2	25-08-19
— 52	AMRE	1000	HY	M	WG 2	62.0	15.5	7.2	8.3	25-08-19
— 53	BTNW	1030	HY	F	NP-10	60.0	15.9	8.0	7.9	25-08-19
— 54	BTNW	1030	HY	F	NP-10	59.5	16.1	7.2	8.4	25-08-19
— 55	BTNW	1030	HY	M	WG-2	60.0	15.9	7.4	8.2	25-08-19
— 56	BTNW	1100	HY	M	WG-2	59.0	15.6	7.5	8.1	25-08-19
— 57	BTNW	1100	HY	M	WG-1	61.0	15.9	7.5	8.4	25-08-19
— 58	AMRE	1100	HY	M	NP-10	63.5	15.6	7.6	8	25-08-19
59	WIWA	12:00	HY	M	SOL	55.0	16.4	7.6	8.8	"
— 60	WIWA	12:00	HY	M	SOL	54.5	14.9	7.8	7.1	"
— 61	WIWA	7.30	HY	F	WG-1	54.0	15.6	7.6	8	26-08-19
— 62	AMRE	"	HY	F	"	55.5	15.6	7.5	8.1	"
63	AMRE	"	HY	F	"	60.5	15.5	7.5	8	"
— 64	AMRE	"	HY	F	"	63.0	15.6	7.7	7.9	"
— 65	AMRE	0830	HY	M	NP-5	61.5	16.0	8.0	8	"
✓ 66	BTNW	9:00	HY	F	NP-14	59.0	15.7	8.0	7.7	26-08-19
✓ 67	AMRE	9:00	HY	M	NP-14	65.5	16.0	7.9	8.1	"
✓ 68	MAWA	9:00	HY	U	NP-12	58.0	16.5	8.1	8.4	"
✓ 69	AMRE	9:00	HY	F	NP-12	60.5	15.8	8.1	7.7	"
✓ 70	AMRE	9:00	HY	F	NP-14A	61.0	15.9	8.0	7.9	"
✓ 71	AMRE	9:00	HY	M	NP-14A	64.5	16.5	8.0	8.5	"
✓ 72	MAWA	9:00	HY	U	NP-14A	56.5	15.8	8.0	7.8	"
✓ 73	AMRE	9:00	HY	M	JOSH	65.0	16.5	8.2	8.3	"
✓ 74	AMRE	9:00	HY	M	JOSH	64.0	15.9	7.7	8.2	"
✓ 75	WIWA	9:30	HY	M	JOSH	54.5	15.6	8.2	7.4	"
✓ 76	MAWA	9:30	HY	U	JOSH	61.0	15.9	8.2	7.7	"
✓ 77	AMRE	9:30	HY	F	JOSH	59.5	15.2	8.1	7.1	"
✓ 78	AMRE	9:30	HY	F	WG1	62.5	15.4	7.9	7.5	"
✓ 79	WIWA	9:30	HY	M	WG1	55.5	15.8	7.8	8	"
✓ 80	AMRE	9:30	HY	M	WG1	63.5	15.9	8.2	7.7	"
✓ 81	AMRE	9:30	HY	M	WG2	66.0	16.1	7.9	8.2	"
82	AMRE	9:30	HY	F	WG2	61.5	15.3	7.8	7.5	"
83	WIWA	10:00	HY	M	WG2	55.0	16.9	8.0	7.9	"
✓ 84	WIWA	10:00	HY	F	WG2	53.0	16.2	8.0	8.2	"
85	AMRE	10:30	HY	M	WG-1	66.0	16.0	7.7	8.3	"
✓ 86	AMRE	10:30	HY	M	WG-1	65.5	16.6	8.1	8.5	"
87	WIWA	10:30	HY	F	WG-1	53.0	15.1	8.0	8.1	"
88	AMRE	10:30	HY	F	WG-1	61.0	15.9	7.9	8	"
89	WIWA	10:30	HY	F	WG-1	52.0	16.1	8.1	8	"
✓ 90	MAWA	10:30	HY	U	WG-2	57.0	15.9	8.1	7.8	"
✓ 91	WIWA	10:30	HY	M	R-1	56.0	15.6	8.0	7.6	"
✓ 92	AMRE	10:30	HY	F	R-1	60.5	16.1	7.9	8.2	"
✓ 93	AMRE	11:00	HY	M	R-2	65.0	16.3	8.1	8.2	"
94	AMRE	11:00	HY	F	NP13	61.0	15.8	8.1	7.7	"
✓ 95	WIWA	11:00	HY	F	SOL	54.0	15.3	7.8	7.5	"
96	WIWA	11:00	HY	M	NP-5	54.0	15.8	7.8	8	"
✓ 97	AMRE	11:00	HY	M	JOSH	63.0	16.4	8.1	8.3	"
98	AMRE	11:00	HY	M	JOSH	64.0	16.0	8.1	7.9	"
✓ 99	BTNW	12:00	HY	M	R-2	64.0	17.0	7.9	9.1	"
— 00	BTNW	12:30	HY	M	R-2	59.0	23.7	15.5	8.2	"

REMARKS:

*If applicable

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Appendix 2 – Retrap Record Sheet

	Species	Band #	Age	Sex	Weight			Wing Chord	Net	Time	Date
					Total	Bag	=				
–	SOSP	2261-19828	HY	U	27.6	9.2	18.4	63.5	WG-2	10:00	09.04.19
–	COYE	2820-69385	HY	M	19.1	7.7	11.4	54.5	NP10	1030	
–	YBFL	2820-69379	HY	U	18.5	7.9	10.6	64	NP4	1030	
2018	BTNW	2680-90969	AHY	M	17.3	8.4	8.9	57	SOL	1030	
–	BAWW	2820-69395	HY	M	17.5	7.7	9.8	68	NP10	1100	
–	AMRE	2760-62105	AHY	M	16.3	8.0	8.3	62	NP-2	1300	
–	COYE	2820-69387	AHY	M	18.2	8.2	10	52.5	NP4	0830	09.05.19
2017	BCCH	2830-68023	AHY	U	19.2	7.9	11.3	62	NP4	0830	
–	COYE	2830-68924	AHY	M	18.1	8.1	10	55.5	NP5	0900	
–	BTNW	2760-62358	HY	M	16.4	7.7	8.7	68.5	JOSH	12:00	
–	MAWA	2760-62350	HY	U	15.3	7.8	7.6	54.5	NP-3	1:00	
–	CMWA	2730-68984	HY	M	17.6	8.1	9.5	66	SOL	1000	09-06-19
–	NOWA	2051-79092	HY	U	25.9	7.6	18.3	71	NP14	10.30	
–	COYE	2720-09214	HY	U	17.5	7.9	9.6	50.5	WG-2	11:00	
Band Age 3B –	AMRE	2790-86098	AHY	F	16.1	8.0	8.1	60.0	WG-2	1:00	

Appendix 3 – Daily Log (Side 1), Weather and Notes

WEATHER AND MIGRATION INFORMATION

SKY CONDITIONS: Partial overcast at opening with some fog at treetop level. Becoming sunny and clear by 0900_____

_____

_____

TEMPERATURE (C): Open: 14C Close: 20C

WIND DIRECTION AND STRENGTH: Open: 0 SW Close: 2 W

NOCTURNAL MIGRATION NOTED: NONE _____

NOTES: NP14A closed briefly to clear fallen branch from net lane _____

BOBO: 3 seen flying towards SW high above the island _____

_____

_____

_____

_____

_____

_____

_____

_____

Pond Cove Shorebirds and other species noted:

BBPL:	AMGP:	SEPL:	KILL:
GRYE:	LEYE:	SOSA:	WILL:
SPSA:	WHIM:	RUTU:	REKN:
SAND:	SESA:	LESA:	WRSA:
BASA:	PESA:	DUNL:	STSA:
SBDO:			

_____

_____

Appendix 4 – Daily Log (Side 2), Net Opening Record

DAILY RECORD 2019 (1/DAY)

DATE AUGUST 20, 2019

	OPENED	CLOSED	OPENED	CLOSED		OPENED	CLOSED	OPENED	CLOSED
					SOL	_0630__	__1300__		
NP2	_0630__	__1300__			WG1	_0630__	__1300__		
NP3	_0630__	__1300__			WG2	_0630__	__1300__		
NP4	_0630__	__1300__							
NP5	_0630__	__1300__			G1	_0630__	__1300__		
					G2	_0630__	__1300__		
NP10	_0630__	__1300__							
NP12	_0630__	__1300__							
JOSH	_0630__	__1300__							
NP13	_0630__	__1300__							
NP14	_0630__	__1300__							
NP14A	_0630__	__1000__	__1030__	__1300__					
ROSS1	_0630__	__1300__							
ROSS2	_0630__	__1300__							

TOTAL NET HOURS ____110_____