Field Protocol
for Monitoring Bird Migration
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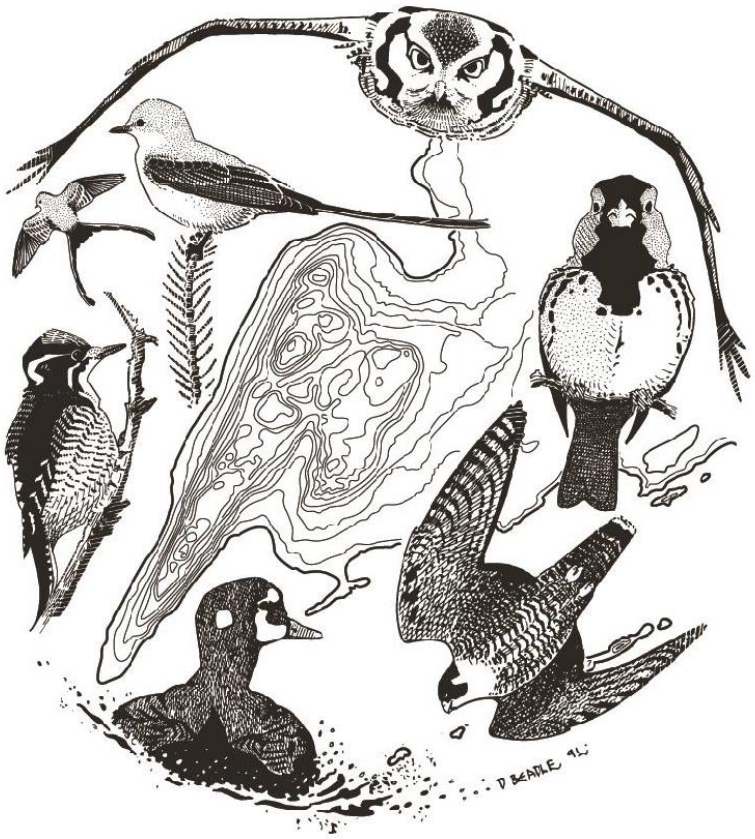

THUNDER CAPE
BIRD OBSERVATORY
THUNDER BAY, ONTARIO

Revised: December 2022

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This document is based on previous protocol versions: Shepherd (1993, 1994), Wojnowski and Hussell (1995, 1997), and Wojnowski et al, (1999, 2000). Revised Boardman, R. December 2022.

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1.0 INTRODUCTION

Thunder Cape Bird Observatory (TCBO) was established in the fall of 1991. TCBO is part of the Canadian Migration Monitoring Network (CMMN), monitoring and documenting trends in populations of Canada's migratory birds. Situated at the tip of the Sibley Peninsula on Lake Superior, Thunder Cape offers an ideal locale to monitor the migration of waterbirds and landbirds of northwestern Ontario.

TCBO is a joint project of Birds Canada (BC), Thunder Bay Area Naturalists (TBFN) and the Ontario Ministry of Natural Resources and Forestry – Wildlife Assistance Program (WAP). Fisheries & Oceans Canada and Sleeping Giant Provincial Park (SGPP) provide additional onsite support. TBFN has Memoranda of Understanding with Birds Canada for operational responsibilities, and with Fisheries and Oceans Canada for site usage.

Migration monitoring methods at Thunder Cape follow procedures recommended by the North American Migration Monitoring Council (Hussell and Ralph 1996) and are similar to methods used at Long Point Bird Observatory (McCracken *et al.* 1993) and elsewhere. This protocol provides a description of field procedures currently in practice at the Thunder Cape site. It is intended that this protocol should enable personnel who are unfamiliar with the site to collect data in the future in a manner that is consistent with current procedures.

1.1 GENERAL OPERATIONS

Daily operations during migration seasons consist of 7 hours of standardized counts. using a combination of banding and a continuous 6 hour watch from a fixed site. In addition, records are kept of other birds observed within the official count area.

Long-term population trends based on migration counts are only credible if based on count methods and effort levels that are consistent from day to day and year to year. The following operations protocol describes data collection methods in detail, and must be followed by all staff and volunteers.

1.2 Personnel

A minimum of three people are needed to conduct all standardized procedures on days with typical levels of bird activity (recognizing that there may be a few days each season when operations must be curtailed due to unusually high bird volume unless additional help is available). At least two (including the Bander-in-Charge (BIC)) must have level 1 birding skills (Table 1).

- One Field Supervisor/BIC: an experienced birder and bander with a master banding permit or sub-permit. The BIC is responsible for ensuring that trapping, netting and banding is conducted safely and in accordance with this protocol.
- Experienced and capable birder qualified to conduct the standard Visible Migration Watch and able to assist with the mist-netting.
- One additional Field Assistant/Intern.

Table 1. Observer skill levels

Class	**Criteria**
1	Able to identify over 75% of birds encountered.
2	Able to identify 50 to 75% of birds encountered.
3	Able to identify less than 50% of birds encountered.

1.3 Seasonal Coverage Period

The spring season runs annually for a period of 35 days commencing, as access allows, in the last week of April and running into early June. The autumn season commences on August 1 and runs for a period of 90 days until October 31. Daily coverage is interrupted only by conditions unsafe for operators and/or birds. Even partial coverage is better than none at all.

1.4 Daily Coverage Period

The Daily Coverage Period shifts daily as the seasons progress, beginning 45 min before sunrise and ending 7 hours after sunrise, with different activities having their own time slots (e.g. Table 2). Weather is recorded at dawn, noon and dusk (see Appendix 4).

Table 2. Sample of the daily operating schedule for May. The full schedule for each season is available on site.

TCBO DAILY OPERATING SCHEDULE

MAY

DATE	START OF COUNT PERIOD	MIST NETS	START WATCH	HAWK NETS, JT & GT's	END WATCH	CLOSE NETS & TRAPS	END OF COUNT PERIOD
	-45 min	-30 min	SUNRISE	+30 min	+6 h	+6.5 h	+7h
1	5:50	6:05	6:35	7:05	12:35	13:05	13:35
2	5:45	6:00	6:30	7:00	12:30	13:02	13:30
3	5:45	6:00	6:30	7:00	12:30	13:00	13:30
4	5:45	6:00	6:30	7:00	12:30	13:00	13:30

1.5 Coverage Area

The Count Area (Figure 1) extends approximately 2 m beyond the outer edge of paths used to access traps and nets (Figure 2), such that observers may step beyond the paths a few metres if needed to identify a particular bird. All birds identified by an observer standing inside these boundaries are counted, no matter how far outside the boundaries they may be. All birds banded or observed from outside the Count Area, including at the observation tower (yellow star in Figure 1), are recorded as non-standard observations.

Figure 1. TCBO and boundaries of the official Count Area. The yellow star marks the location of a tall observation tower.

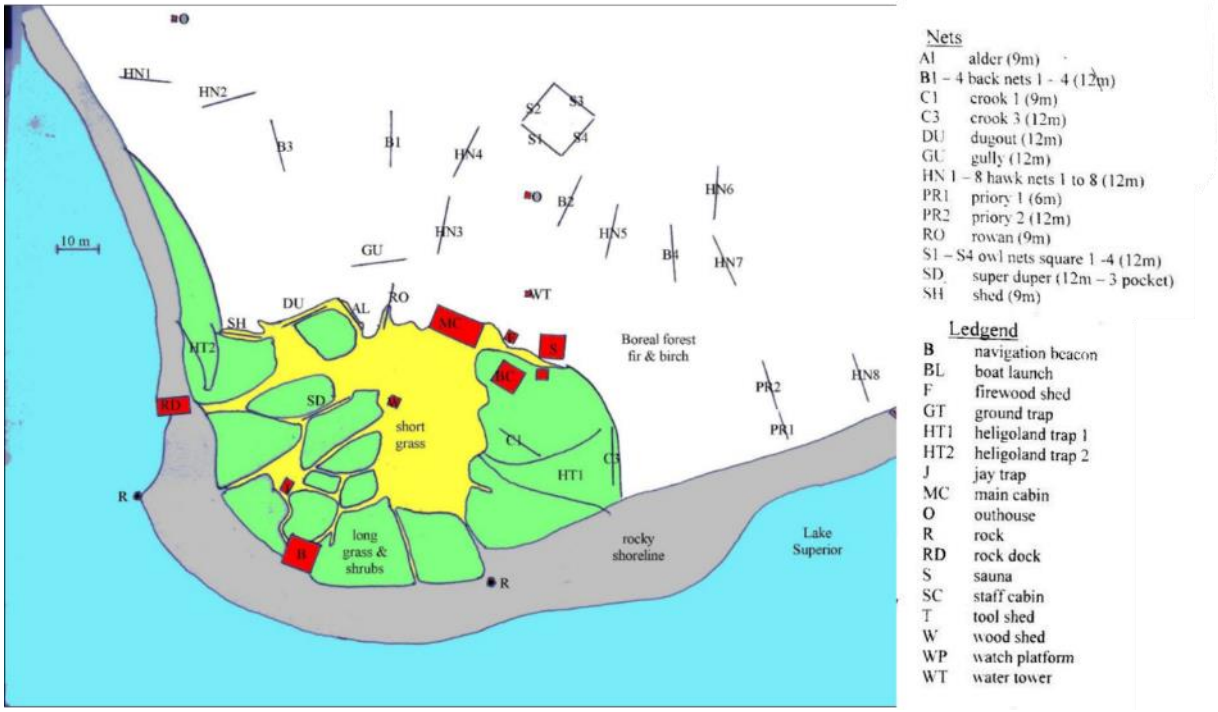

Figure 2. Nets, traps and key infrastructure at TCBO. Colored patches indicate habitat types, with white indicating forest (see Figure 1). See Appendix 1 for GPS coordinates of key locations.

2. 0 VISIBLE MIGRATION COUNT

Daily completion of a 6 hour visible migration watch is the highest migration monitoring priority at TCBO. Continuous observation of visible migration begins at official sunrise (see Table 2).

The watch is conducted from the observation platform situated in the clearing area immediately south of the cabin (see Figure 2). The platform is 8' (2.4 m) square and about 2.5' (0. 75 m) high. In inclement weather (particularly in spring), when visible migration of landbirds is minimal and migration of waterfowl is substantial, the watch may be conducted from outside of the cabin in front of the window by the settee.

Normally, one observer will be designated as the official observer and recorder at any one time, but they may be assisted by 1 to 3 other observers when available.

A scope should be used for the Watch. TCBO provides a scope and tripod, but observers may use their own if preferred.

The watch data are to be collected independently of counts using other methods (see below), All birds seen or heard during the watch should be recorded, even if the same individuals are seen before the start of the count period or were later trapped.

Field records are kept on the Visible Migration Data Sheet (Appendix 1A), with birds being classified either as visibly migrating (Vis) or observed (Obs). In general, birds that have landed and are moving through the vegetation are recorded as "Obs" (not visibly migrating). Judging whether a bird or flock is 'visibly migrating' should follow these guidelines:

1) Waterfowl moving from left to right (east to west) off the Cape in spring and from right to left (west to east) in fall are migrating.
2) Landbirds moving away from the Cape *and not seen to return* are migrating, as are hawks seen coming in off the lake in spring.

Judgement is also required to minimize double counting of flocks or individuals milling around the tip of the Cape, and to avoid undercounting migrants that appear to be milling around but are actually moving through. Supplementary observations from the tower may reveal movement patterns of some species and help to determine whether birds are circling the Cape or moving out of the area.

Experience suggests that most individuals and flocks that do not immediately attempt an overwater flight spend a relatively short time at the Cape and then move on, often departing up the west shore of the Cape (at least, in the fall). Low numbers of banding recaptures of species such as Sharp-shinned Hawks, Downy Woodpeckers, Black-capped Chickadees, Red-breasted Nuthatches, and Cedar Waxwings, also indicate that most (though not all) individuals move on relatively quickly. Therefore, in the absence of contrary evidence, adhere to the following guidelines.

Flocks of blackbirds, Blue Jays, Cedar Waxwings, finches, etc. (usually flying above the tree-tops) that disappear then reappear within a 15 minute period in the same numbers (+/- 5%) should be treated as the same individuals and not be counted again, Flocks apparently "reappearing" more than 15 minutes after they were last seen should be treated as new. Individuals, loose flocks and groups of hawks, woodpeckers, chickadees, nuthatches, warblers, etc. that fly through the clearing or alight in the trees around the clearing, stay for a while and then disappear, should be treated as new if at least 5 minutes has elapsed since similar birds of the same species were last seen. If there is evidence of continual movement of new birds into and out of the area during any period, these should be counted as new, regardless of the preceding "5 minute" guideline.

Guidelines (3) to (4) are intended to promote consistency in the visible migration count by different observers and between years. However, they are only guidelines - designed to help make consistent decisions in cases where there is doubt about whether birds are new or repeaters. If there is concrete evidence (such as tower observations or banding recaptures) indicating that following the guidelines would lead to double-counting or under-counting on a

particular day, then follow the available evidence for that day. Nevertheless, in the absence of contrary evidence, ignore personal opinions and follow the guidelines.

Unidentified Empidonax, thrushes, sparrows, vireos and warblers should be recorded as such. In the case of warblers only, a distinction is made between unidentified “Low-flying Warblers” (a term which includes warblers seen on the ground or in shrubbery, landing in or departing from trees around the clearing, or flying below tree-top level) and High-flying Warblers (warblers that were never seen lower than tree-top height). The distinction is made because high-flying warblers are excluded from Daily Estimated Totals (see section 5). However, High-flying Warblers that can be identified to species should ALSO be recorded on the ‘Obs or Add Obs’ sheet. When recording High-flying Warblers in the CMMN DET Program, the High-flying Warblers should be entered as Unknown Warbler,

3.0 CAPTURE AND BANDING

3.1 Standard capture

The standard Banding Period extends for 7 hours, from first light (30-45 minutes before sunrise) to approximately 6½ hours after sunrise (see Table 2). Mist nets and Hawk nets must be opened and closed in the same order each day as conditions permit,
Opening and closing of nets and traps will always be at the discretion of the BIC. Such discretion will be exercised regarding weather conditions such as rain, fog, mist accumulating on nets, wind, damage to nets, presence of predators, and/or excessive numbers of birds. Nets which are "blown out" during windy conditions are to be closed.
Nets are normally set high enough off the ground to minimize potential predation by small mammals, but if problems arise, weasels, chipmunks or other predators should be trapped and relocated if possible. At times, deer, foxes and bears can be a concern to birds, equipment, and personnel. When an encounter of any predator occurs, all cooperators must be informed as soon as possible, and all cautions must be considered to mitigate danger to avian species and personnel including the closing of nets or traps.
A variety of traps and nets are used as part of the standard operating protocol (Figure 2) and are operated as described below. Captured birds are placed safely in cotton bird bags and once tied, a standard wooden clothes peg is attached to the drawstring indicating which location the bird was caught. Pegs clearly marked with the net name are located at the ends of each net and trap. The pegs are returned to their respective net in subsequent net rounds.

a) Heligoland Traps

Two Heligoland traps are located along the shoreline to the east (HT1) and west (HT2) of the main clearing (Figure 2).

Each day, at least six drives of each Heligoland Trap are to be completed during the Banding Period. The first HT drive of the morning starts at first light, 30-35 minutes before official sunrise, immediately before opening the passerine nets (Table 2). Two more drives are

completed between the time when those nets have been opened (30 minutes before sunrise) and when the late nets are opened (30 minutes after sunrise). Three more HT drives are to be completed before the end of the Banding Period.

- Ideally HT1 should be driven by at least two people, following the paths starting at Priory (PR) net. HT2 should be driven by two people starting at Hawk Net 1 (HN1), although it can be driven successfully by one person moving along the beach and then moving to mid-trap at the entrance.
- HTs are to be driven regardless of weather conditions or bird numbers, but birds may be released immediately without banding if more are captured than can be handled safely. Additional drives of the Heligoland traps should be made if nets cannot be opened because of adverse weather.
- Keep track of the number of HT drives for entry on the Daily Log sheet. If birds are captured in the HTs incidental to other activities and without a full-scale drive, do not record this as an HT drive.
- At the end of each day's activities care must be taken to watch that birds are not trapped in the catching funnel and are unable to safely exit the main entrance.

b) Passerine Mist Nets

- All nets and traps are to be checked every half hour from their time of opening.
- All mist-nets are normally closed 6.5 hours after sunrise. If netting time is lost in this period, then, if conditions permit, nets should stay open to make up some or all of that time until 7 hours after sunrise.

c) Hawk Nets

An array of eight nets is set up at standard locations (Figure 2, Appendix 1). These nets are normally operated daily for 6 hours starting 30 minutes after sunrise for a total of 48 net-hours per day.

Linear brush piles are to be maintained at a height of 3' (1 m) on both sides of all the hawk net lanes (see photos, section 6.2). These brush piles are effective in preventing low-flying hawks from going under the hawk nets.

d) Jay Trap and Ground Traps

The Jay trap and eight ground traps (four 0.5" x 1" welded mesh, four 1" by 1" welded mesh) are operated daily for 6 hours starting 30 minutes after sunrise. The ground traps are distributed as follows: three on the beach between the HT1 and HT2. and five on the mown short-grass areas (lawn or pathways) within the clearing (see Figure 2, appendix 1). Within these areas, the exact positioning of the ground traps can be adjusted slightly depending on water levels, wind, and bird activity. The ground traps are baited with a handful of cracked corn per trap. The Jay trap is also kept baited with cracked corn.

The Jay Trap door is fully and firmly propped open and the Ground traps are entirely turned over at the end of the Count Period. This is undertaken 6 hours after sunrise. As with the mist nets these can be operated for an additional half an hour if time is lost during the prescribed Standard Count Period.

3.2 Non-standard capture

Non-standard banding (NSB) during the Count Period is allowed only if it does not interfere with standard operations or affect the number of birds that would be counted if non-standard operations were not underway. Most NSB at TCBO during the Count Period consists of shoreline trapping (shorebird trap, single panel net on beach, or by hand), though rarely a specific individual bird may be targeted for capture. Birds caught during the standard period in non-standardized nets or traps must be denoted as NSB (non-standard banding) in the remarks column on the banding sheets (Appendix 2).

Additional capture after the normal closure time may be done at the discretion of the BIC, either using standard or non-standard nets or traps. All such after-hours captures are recorded as ADB (Additional Banding).

3.3 Attractants

Use of bird seed, suet, water drips, audio-tapes or other means of attracting birds to the Count Area is not permitted with the following exceptions:

- Cracked corn is used to bait the ground traps and Jay trap as described below.
- One bird feeding station is maintained in a fixed location by the Rowan net as shown on Figure 2. The feeding station consists of a small, elevated table (approx. 30 by 50 cm) on a post about 5 ft (1.5 m) high. The feeder is kept stocked throughout the spring and fall migration periods with one cup of cracked corn and one cup of sunflower seeds daily. The feeder is cleaned out once a week or more frequently if seed becomes wet. Remove the feeder and pole and store inside the tool or sauna shed at the end of each season.
- During the spring and early fall, two hummingbird feeders are also used and are located hanging from the west and east corners of the main cabin. Hummingbird feeders are cleaned weekly during the season. They are removed, cleaned, and stored at the end of the spring season and cleaned and stored again in the autumn on approximately September 15.
- Nocturnal audio-luring of owls is permitted within the guidelines outlined in the separate owl monitoring protocol.
- Short-term use of audio lures to attract and trap target species may be permitted after the standard Count Period (e.g, tape luring of winter finches), at the discretion of the BIC. Any projects requiring more regular use of audio lures (other than nocturnal owl banding) must be pre-approved by the Science Committee of the Canadian Migration Monitoring Network.

3.4 Banding Operations

Certain species (such as Ruby-throated Hummingbird and Ruffed Grouse) are always released unbanded because they require special bands/permits, but they are recorded as Obs or Other Obs the Daily Log sheets.

The sample banding forms (Appendix 2) indicate the data to be collected.

- Species: all birds must be identified to species before being banded and must be released unbanded if ID is not 100% certain. Take photos, measurements, and notes for unidentified birds if time permits.
- Age, Sex and how these are determined (see codes on table on wall of banding lab representing BANDIT programme codes). While staff must try to age and sex all individuals, it is important not to record an age/sex if the bander is not extremely confident (95% certain) of the bird's status. Record age/sex as Unknown (Numerical Code 0) if there is any uncertainty.
- Wing chord: natural relaxed position, relaxed/unflattened (mm)
- Weight: Mass to the nearest 0.5 gram.
- Fat: 0-7 numerical scoring system (Appendix 3)
- Skull Ossification – scoring system ranges from 1 (trace skull), to 6 (fully-ossified skull) – Appendix 3.
- Time weighed/time trapped – Local time, to the nearest ten-minute interval. Use 24-hour clock, and three-digit code i.e. 6:00 am is 060, 11:25 am is 113, 1:40 pm is 134.
- Net or trap where caught.

Band numbers of recaptured birds should always be checked prior to release to ensure that foreign encounters are detected. Birds recaptured a day or more after banding are processed as usual but details are recorded on retrap cards (Appendix 2). If recaptured again the same day, release the bird as soon as the bird is confirmed as a same day recapture – preferably at net or trap.

a) Dealing with too many birds

Birds should not be held for more than **one hour** from the time they are extracted from nets. If necessary for the sake of bird safety to begin omitting data (i.e., too many birds are backed up for banding), then the data that absolutely must be recorded are band number, species, and capture time. Record age and sex if immediately obvious, but wing measurement, weight, fat, skull ossification and close examination required for sexing or aging may all be omitted. Of all the omitted data, wing measurement and weight are the data most used by other researchers, so give those measures priority if you can. Birds held more than one hour should be released unbanded after recording the species and number of individuals for recording in the Capture column on the Daily Log Sheet,

If a large backlog of birds occurs and steps must be taken to reduce captures, proceed as follows. **All** mist-nets and/or all hawk nets and/or all ground traps are to be closed until it is safe to open them again, when **all** nets are to be reopened together. During the Standard Banding Period, the closing priorities are as follows: Mist nets, hawk nets, Heligoland Traps, Jay and Ground Traps. If large numbers of birds are present the Mist nets should be closed first, then the hawk nets. The order is reversed for the reopening nets and traps.

b) Injuries

Birds should be released immediately at the net in poor weather conditions or after a difficult extraction if they show signs of heat exhaustion, torpor, or undue stress (e.g., eyes closed, head waggling, feathers very fluffed). Place the bird back in a bag if it does not fly and take steps to assist in its recovery. On cold days, place the bag containing the bird inside another bag containing a hand warmer (i.e. avoid direct contact between the bird and the hand warmer). On hot days, place the bird in its bag in a cool, shady spot. In either case, the bird should be kept in a quiet location. In the case of captured hummingbirds that are observed to be in distress, carefully administer sugar water via an eyedropper. Check the bird at least once every hour, being careful not to disturb it more than necessary, and if it is observed to have recovered (eyes are open, bird is active and moving well), release it. If the bird has not recovered well enough to fly after a few hours. place it slightly off the ground in a location some distance from the netting area.

Any bird that is held for reasons of stress or injury must be recorded in the Casualty Log (Appendix 2) along with details of its condition, the steps taken for its recovery, and its condition upon release. This also applies to birds that are released at the net – for example, if a bird is badly tongued and is bleeding, the extractor may decide to release it rather than subjecting it to the additional stress of being banded, Such a bird should be counted as a Capture and the details of the case recorded in the Casualty Log; in addition, the BIC must be informed so that the situation may be discussed with other staff and volunteers, and any necessary steps to prevent or alleviate such injuries in the future can be carried out,

4.0 OTHER OBSERVATIONS

Keep note of all birds observed during the Count Period that are not included in the 6-hour Visible Migration Count. ‘Other observations’ include birds detected during net-rounds, observed from the watch platform before or after the 6-hour standard observation period, and any other observations from within the Count Area. As with the Visible Migration observations, low-flying and high-flying warblers (identified or unidentified) are recorded separately, and high-flying warblers that can be identified should be recorded as ‘Add Obs’ rather than as ‘Other Obs.’

5.0 RECORD KEEPING

At the end of each day, records are compiled and daily summaries prepared on Log Sheets (Appendix 4). The first page reports personnel, their hours of effort, and skill level (Table 1), weather (appendix 4), and hours of effort for Watch and netting. (Any netting or trapping effort outside the Coverage Period or outside the Count Area should be recorded on the Daily Log sheet, even if no birds are captured). An overall coverage code is also recorded, ranging from 0 to 5, is assigned based on the actual effort during the Count Period (daybreak to 7 hours after sunrise) that day. The coverage code takes into consideration the number of observers and their skill levels (Table 1), as well as the overall counting and trapping effort. The coverage codes and the criteria used to assign them, are described in Table 3. For the code to be assigned, all the listed criteria must be met. The aim should be to achieve Code 4 coverage. but Code 3 is acceptable in poor weather conditions,

Table 3: Coverage Codes

Code	Coverage	Criteria
0	**No coverage**	
1	**Casual**	Casual observations and/or banding. No Visible Migration Count. No ETs.
2	**Poor**	At least 1 Class 1 observer active throughout Count Period; 2-6 hours Visible Migration Count; no or only casual trapping and/or netting.
3	**Fair**	At least 2 Class 1 observers active throughout Count Period; 6 hours Visible Migration Count; 6 x 2 Heligoland Trap runs, but netting may have been restricted by weather to < 75% coverage (<61.125 n-h, see Table 3).
4	**Good**	At least 2 Class 1 observers and at least 1 Class 2 (or better) observer active throughout Count Period; 6 hours Visible Migration Count; 6 x 2 Heligoland trap runs; at least 75% netting coverage (61.125 n-h. Table 3), unless reduced by excessive numbers of birds.
5	**Excellent**	At least 3 Class 1 observers and at least 1 Class 2 (or better) observer active throughout Count Period; 6 hours Visible Migration Count; at least 6 x 2 Heligoland trap runs; full passerine mist net-hours (81.5 n-h, Table 3); other traps in operation.

Counts are recorded on the next pages of the Log forms. Columns for Band, Rec[capture], and Vis and Obs are filled in with data from banding sheets and the Watch field sheets, respectively. Any birds captured during the Count Period as NSB (e.g. shorebirds) should be included on the log sheet as 'Other Obs.' All participating personnel work together to complete the remaining columns.

5.1. Estimated Totals

The Estimated Total (ET) is the best estimate of the number of individuals of each species actually **detected** in the Count Area during the standard Count Period (daybreak to 7 hours after sunrise). The leader will call out each species in turn, indicating numbers already entered and asking for 'Other Obs.' In its simplest form, the ET is the sum of numbers for Band, Rec, Vis, Obs and Oth Obs. (Birds caught during the standard period in non-standardized nets or traps are reported as NSB in the remarks column on the banding sheets, but are included in the regular Band column on the Daily Log. KS birds—see next section—are also already included in the columns that make up the ET.)

The sum of Band, Rec, Vis, Obs and Oth Obs columns, however, often includes some duplication. In particular, birds reported as 'Other Obs' may duplicate numbers reported by others (e.g. 2 people noted an unusual species in the same place at the same time), or birds that were reported as Other Obs when they sang before dawn may have been counted again as 'Obs' during the Watch. Possible duplication is discussed, and the number chosen for ET is the best estimate of the total number of separate individuals detected within the Count Area during the Count Period. ET's are very often *lower* than the sum of numbers in the columns.

Some unidentified birds can be included in ETs, but not all. Warblers flying above tree top level (and never seen lower than tree top height) are recorded as "High-flying Warblers" and are NOT to be included in the daily Estimated Totals (ETs) on the log sheet, however they are recorded in the CMMN DET programme as Unknown warblers. This is to remove bias in the ETs caused by varying ability of observers to detect, identify and count warblers flying at high altitudes, especially when they occur in large numbers.

With the exception of this group, some unidentified low-flying warblers, *Empidonax*, sparrows, thrushes, etc. may be assigned to species approximately in proportion to the number of identified individuals observed or captured. For example, if there were 10 unidentified warblers and half of the 50 warblers banded that day were YRWA, it might be reasonable to assume that 5 of the unidentified warblers were also YRWA. On the other hand, if the remaining 50 identified warblers represented a wide mix of species, there is no justification for assigning the remaining 5 unidentified warblers to particular species. Sometimes it will be possible to narrow the options. For example, size and other characteristics may indicate that the majority of unidentified warblers are *Dendroica*, in which case proportions of *Dendroica* observed or captured should dominate determination of the ETs. (Judicious consideration of the species composition of identified high-flying warblers may also be used to assign unidentified low-flying warblers. if the species composition of high- and low-fliers appears to be similar). Although these procedures allow estimates of some species to be justifiably increased, many unidentified birds will likely remain unassigned.

Participants should recognize that ETs likely give a more accurate picture of what was present in the area each day than is the simple sum of all reports, and should not agonize over adding or subtracting a few individuals.

5.2. Known Stopovers

Migration monitoring trend analysis assume all birds counted on a given day are newly arrived migrants, and identifying "Known Stopovers" (“KS”) allows analysts to omit these from trend analyses if desired. KS is recorded only for birds observed during the standard Count Period (ending 7 hours after sunrise).

Known Stopovers are individuals that are most likely to have been recorded in the Count Area earlier in the same season. ***Do not guess.*** If there is no clear **evidence** that the bird was present on a previous day within the same season it should not be included in the KS column. Examples of KS include:

- Individuals of species known to breed in the area that show territorial behaviour, (including individuals singing from the same or nearly the same location each day), are associated with a known nest site, are seen with a brood, are still completely in juvenal plumage and/or have growing remiges and rectrices, or are adults in heavy flight feather moult (at least two primaries or secondaries missing or growing)
- Banded birds not recaptured that day but of a species that has not been frequently banded
- Individuals recognizable, by plumage features or unusual or consistent (including sick and injured birds), as having been present on a previous day
- Rarities occurring so infrequently that new individuals are highly unlikely to appear on sequential days
- When obvious stopover flocks occur, a conservative estimate of numbers stopping over should be made, based on the proportion of birds observed or captured that had been banded on previous days
- In fall, adults or young (including young in juvenal plumage) of known breeding species found repeatedly in the same general location. This is most likely to occur prior to the normal migration period for the species, but it may continue into the migration period.
- Special problems occur with Merlin and Peregrine Falcons that are seen regularly outside peak migration periods and are probably breeding nearby. Outside peak migration periods (15 April to 15 September) birds of these species that do not appear to be migrating should be recorded as KS. **During the migration periods they should be recorded as KS only if there is convincing evidence that they are local birds.** Such evidence might include daily or frequent observations of birds flying low over the Cape and returning inland (especially if this behavior has continued from before the migration period) and absence or little migration of other raptors on the same day. Peregrine Falcons identified as the *tundrius* race are migrants that will rarely qualify as KS. Merlin and Peregrines flying high and directly in the appropriate migratory direction on days when other raptors are migrating should be treated as migrants and not be recorded as KS.

5.3. Daily Species Totals

The final columns on the Log Sheets are for recording 'Additional' ("ADD") birds observed or banded outside the Standard Count Period (Add Band, Add Rec, Add Obs), plus birds observed at any time that were recorded outside the Standard Count Area (mainly Twr Obs: birds recorded at the observation tower shown on Figure 1). The Daily Species Total "DST" is the sum of the ET and all these extra observations, again deleting any individuals likely to have been double-counted.

6.0 HABITAT MONITORING AND MANAGEMENT

6.1 Maintenance

Because of the short growing season attributable to latitude and cooling effects of Lake Superior, vegetation growth can be quite fast during the peak growing season. Habitat maintenance at Thunder Cape is an ongoing task and has two main purposes. First, it is to maintain consistency in the habitat from year to year to reduce site effect on the data being collected. Second, to maintain good relations with the landowner, Fisheries and Oceans.

Photographs of the various areas and habitat are available on the TCBO laptop and a copy is printed in a binder kept at the station. The purpose of these is to provide a reference to avoid habitat creep (i.e. regrowth changing the characteristics over time).

The Count Area consists of a large clearing, situated between the cabin and the tip of the Cape, surrounded by boreal forest dominated by Balsam Fir and White Birch (see Figures 1 and 2). The perimeter of the clearing is indicated by the dashed line on Figure 2. The boundary is two metres northwest of HN1, two metres east of the boat launch, and two metres north of the north end of B1. The vegetation within the clearing, consisting of a mix of short grass and shrub thickets with scattered small trees, requires intensive management so that it remains in a similar condition from year to year.

The boundaries of the short grass areas which require regular mowing are marked by cut grass, edge of gooseberries, and dogwood as shown in Figure 2. The dogwood and other shrubby areas within the clearing all require regular pruning (June and September). The shrubs along the shoreline, near the light beacon and either side of SD net should be maintained at a height of about four feet (1.2 m) so that the shoreline can be seen from the watch platform and low-flying waterfowl are not obscured from view. The immediate area around the Coast Guard Navigation beacon is also to be cleared of vegetation to ensure easy accessibility. Most trees within the clearing are kept at or below 7 metres in height by either topping the trees to bring them to less than 5 metres height or removing excess trees if a healthy replacement tree of the same species is growing nearby. The only trees within the clearing which are not actively managed are the mountain-ash trees beside Rowan (RO) net and the birch trees near HT2.

The lawn area near the beacon (Figures 1 and 2) is used by the Coast Guard (and Air Ambulance) as a helicopter landing pad. It is important that this area be mowed regularly and kept free of loose objects such as lawn chairs, boards, etc. Ground traps and nets in the vicinity of the landing pad should not hamper the possibility of a helicopter landing on the site.

In order to achieve optimal efficiency in trapping with HTs the trees leading to the mouth of the traps should be trimmed and maintained so that there is a slow and decreasing gradient in tree height. This will force canopy birds to come down to trap level in a more "natural" fashion. Shrubbery within the HT funnels should be managed to encourage birds to move into the traps yet ensure that they flush when the trap is driven. The paths used to drive the HTs should be kept clear of fallen logs and other obstacles.

Net lanes require annual clearing. In addition, vegetation within 10 m of any net may be managed (e.g. trees and shrubs topped at 3 to 5 m height) to maintain the catching efficiency of the net.

6.2 Photographic Records

A regular schedule of photographs of each net lane and trap, and a few that give an overview of the Count Area from the Watch site provide a very helpful record for data users. Habitat change affects the species and numbers observed, and the habitat records allow researchers to quickly assess whether their use of the data is likely to be adversely affected by changes that have occurred.

Photographs are to be taken from the locations described in Appendix 1. Photos should be taken annually, in August. Name the files for each photo as follows: ' [SUBJECT NAME]_TCBO_ [DD] [MONTH] [YEAR].' Example: 'HT1_TCBO_20 June 2021.' Place all photos in year folders, e.g.: 'Site photos_TCBO_2021'. Save this folder on the TCBO laptop and submit a copy to Birds Canada when requested.

6.3 Assessment of Habitat Structure

In addition to photographic records, periodic assessments of habitat structure within the Count Area shows whether there are major shifts in the proportions of open/transitional/wooded habitat. Assessments follow the system developed by CMMN, based on a system formerly used by the MAPS program (Monitoring Avian Productivity and Survival Assessment) should be carried out once every 5 years beginning in 2023, and whenever there has been a significant change to the Count Area. Habitat assessments are to be carried out in August**.**

Forms and instructions are stored on the ZTCBO laptop and at the observatory in hard copy. File name for each habitat patch file should be: HSA-[PATCH ID]_[STATION NAME]_[YEAR]. Example: for the dominant habitat in 2023 , the file name would be 'HSA-A_TCBO_2023 '. The habitat assessment results should be submitted in a folder labelled 'Habitat assessment

TCBO_[YEAR]'. A copy of the habitat assessment folder is to be saved on the ZTCBO laptop. Another copy will be submitted to Birds Canada along with year-end submission of bird data.

7.0 RECORD OF CHANGES OR MAJOR INTERRUPTIONS IN STANDARDISED DATA COLLECTIONS

Changes or interruptions to operations should be recorded here 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 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).

7.1 Instructions for record keeping

If any standardized operational change or notable interruption occurs, enter details into the table below under any previous entries. Refer to parts of the text that were changed (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.

Table 4. Record of changes affecting standardized operations.

Date	Description of change and justification (if applicable)
1999	Locations and operations for ground traps standardized
Fall 2000	Nets B1-B4 incorporated into standard fall net array
Spring 2001	Nets B1-B4 incorporated into standard spring net array
Spring 2020 and 2021	Did not operate, due to covid restrictions
Fall 2020	Net-hours reduced by about 10% (covid restrictions); lower operational levels due to reduced personnel due to Covid-19 precautions
Fall 2021	Net-hours reduced by about 20% due to 11 days of staff shortage (covid restrictions); participants inexperienced so Watch less productive than usual

8.0 LITERATURE CITED

Hussell, D.J.T., and C.J. Ralph 1996. Recommended methods for monitoring bird populations by counting and the capture of migrants. Unpubl. report of the Intensive Sites Technical Committee of the North American Migration Monitoring Council, 13 pp.

McCracken, J.D., D.J.T. Hussell and E.H. Dunn. 1993. A manual for monitoring bird migration. Long Point Bird Observatory, Port Rowan, Ontario. 65 pp.

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Wojnowski, J.K., C.G. Gibson and D.J.T. Hussell. 1999. A Revised Field Protocol For Monitoring Bird Migration at Thunder Cape Bird Observatory, Long Point Bird Observatory, Port Rowan, Ontario. 11 pp.

Wojnowski, J.K., C.G. Gibson, A. Heagy, and D.J.T. Hussell. 2000. A Revised Field Protocol For Monitoring Bird Migration at Thunder Cape Bird Observatory, Long Point Bird Observatory, Port Rowan, Ontario. 11 pp.

APPENDICES

APPENDIX 1. Locations of traps and photography.

Table 5: Mist Net/Trap GPS Locations (recorded at centre of net). Photographs for habitat control should be taken on the Watch Platform in each of the 4 cardinal directions, and the net lane photographs should be taken from the end which is first approached during a net round pointing along the net towards the far end.

CODE	DESCRIPTION	GPS LOCATION
HT1	Heligoland Trap 1 Catch Box	48°18'7.17"N, 88°56'15.44"W
HT2	Heligoland Trap 2 Catch Box	48°18'7.50"N, 88°56'18.17"W
JT	J Trap Catchbox	48°18'6.81"N, 88°56'17.48"W
HN1	Hawk Net 1	48°18'9.69"N, 88°56'18.86"W
HN2	Hawk Net 2	48°18'9.32"N, 88°56'18.10"W
HN3	Hawk Net 3	48°18'8.67"N, 88°56'15.55"W
HN4	Hawk Net 4	48°18'9.23"N, 88°56'15.27"W
HN5	Hawk Net 5	48°18'8.91"N, 88°56'13.67"W
HN6	Hawk Net 6	48°18'8.92"N, 88°56'12.60"W
HN7	Hawk Net 7	48°18'8.57"N, 88°56'12.52"W
HN8	Hawk Net 8	48°18'7.73"N, 88°56'11.50"W
B1	Mist Net	48°18'9.28"N, 88°56'16.00"W
B2	Mist Net	48°18'8.88"N, 88°56'14.37"W
B3	Mist Net	48°18'8.91"N, 88°56'17.34"W
B4	Mist Net	48°18'8.55"N, 88°56'13.07"W
C1	Mist Net	48°18'7.08"N, 88°56'15.04"W
C3	Mist Net	48°18'6.94"N, 88°56'13.97"W
PR1	Mist Net	48°18'7.49"N, 88°56'12.27"W
PR2	Mist Net	48°18'7.26"N, 88°56'12.23"W
DU	Mist Net - Dugout	48°18'8.12"N, 88°56'17.12"W
SH	Mist Net - Shed	48°18'7.93"N, 88°56'17.93"W
AL	Mist Net - Alder	48°18'8.13"N, 88°56'16.65"W
RO	Mist Net - Rowan	48°18'8.11"N, 88°56'16.35"W
SD	Mist Net - Super-Duper	48°18'7.40"N, 88°56'17.02"W
GU	Mist Net - Gully	48°18'8.40"N, 88°56'16.26"W
GT	Ground Trap	48°18'7.61"N, 88°56'17.59"W
GT	Ground Trap	48°18'7.32"N, 88°56'18.31"W
GT	Ground Trap	48°18'7.26"N, 88°56'18.37"W
GT	Ground Trap	48°18'6.91"N, 88°56'16.40"W
GT	Ground Trap	48°18'6.88"N, 88°56'15.61"W
GT	Ground Trap	48°18'6.70"N, 88°56'16.76"W
GT	Ground Trap	48°18'6.57"N, 88°56'16.29"W
GT	Ground Trap	48°18'6.34"N, 88°56'17.39"W
OWL1	Owl Square Net	48°18'9.34"N, 88°56'14.58"W
OWL2	Owl Square Net	48°18'9.67"N, 88°56'14.41"W
OWL3	Owl Square Net	48°18'9.74"N, 88°56'13.99"W
OWL4	Owl Square Net	48°18'9.53"N, 88°56'13.98"W
WATCH PLATFORM		48°18’07”N. 88°56’16"W
BEACON		48°18’10”N, 88°56’28"W

Table 6: Mist Net Specifications

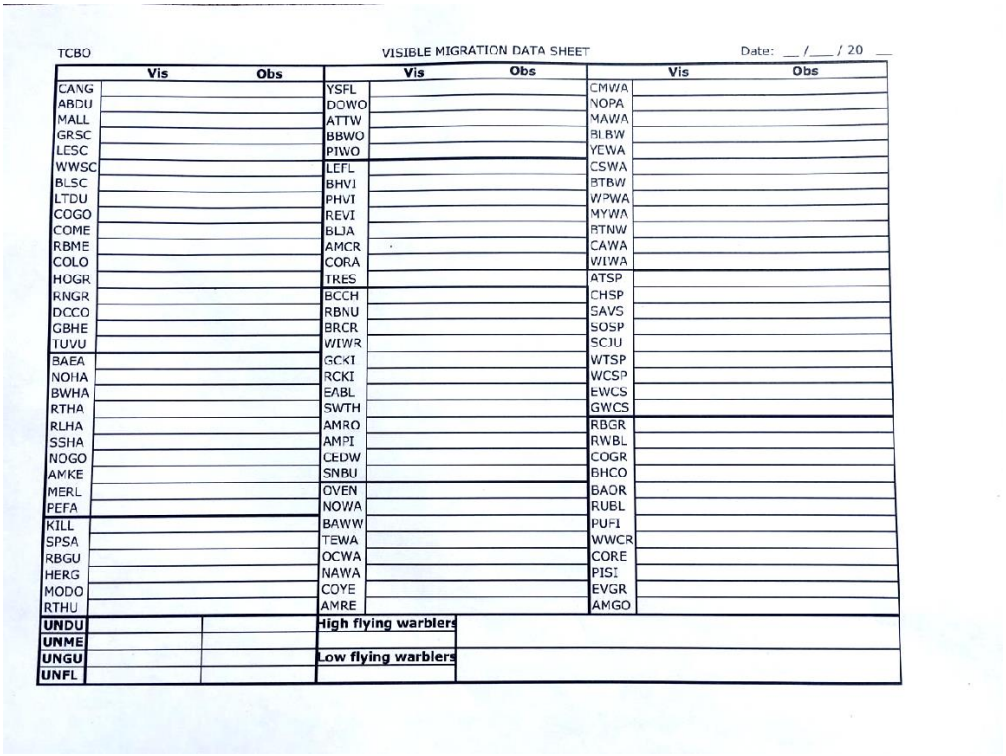
Mist net specifications are detailed below. All of the passerine mist nets should be 1¼" (30 mm) black mesh, 75d/2 ply thread, and tethered. All nets are set on guyed, 10 ft (3 m) high poles. Heights and lengths of nets and heights of poles should be within ± 5% of the metric specification. Hawk nets are 100 mm (4") mesh, 12 meter (40 ft), and tethered.

Net Names	CODE	Length	Height	Panels	Standard Hours	C.F.[&]	Net Hours
ALDER	AL	9 m (30 ft)	2.75 m (9 ft)	4	7	0.75	5.25
CROOK#1	C1	9 m (30 ft)	2.75 m (9 ft)	4	7	0.75	5.25
ROWAN	RO	9 m (30 ft)	2.75 m (9 ft)	4	7	0.75	5.25
SPDP	SD	12 m (40 ft)	2 m (6.75 ft)	3	7	0.75	5.25
GULLY	GU	12 m (40 ft)	2.75 m (9 ft)	4	7	1	7.0
BACK NET #1	B1	12 m (40 ft)	2.75 m (9 ft)	4	7	1	7.0
BACK NET #2	B2	12 m (40 ft)	2.75 m (9 ft)	4	7	1	7.0
BACK NET #3	B3	12 m (40 ft)	2.75 m (9 ft)	4	7	1	7.0
BACK NET #4	B4	12 m (40 ft)	2.75 m (9 ft)	4	7	1	7.0
CROOK #3	C3	12 m (40 ft)	2.75 m (9 ft)	4	6	1	6.0
DUGOUT	DU	12 m (40 ft)	2.75 m (9 ft)	4	6	1	6.0
PRIORY#1	P1	9 m (30 ft)[♦]	2.75 m (9 ft)	4	6	0.75	4.5
PRIORY#2	P2	9 m (30 ft)[♦]	2.75 m (9 ft)	4	6	0.75	4.5
SHED	SH	9 m (30 ft)	2.75 m (9 ft)	4	6	0.75	4.5

C.F.: Correction Factor. To determine net hours, a 12 meter - 4 panel net is counted as 1 net, a 9 meter - 4 panel or a 12 meter - 3 panel is counted as 0.75 net and a 6 meter - 4 panel is counted as 0.5 net.

APPENDIX 2. Data forms

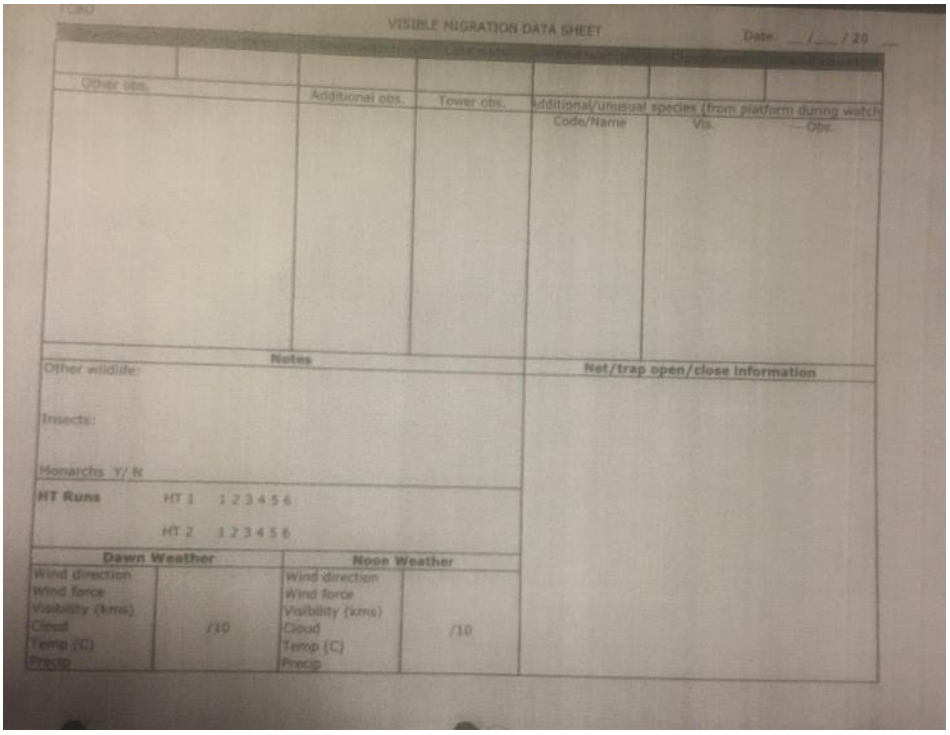
Figure 3. Visible Migration record forms.



TCBO VISIBLE MIGRATION DATA SHEET Date: __ /___ / 20 __

	Vis	Obs		Vis	Obs		Vis	Obs
CANG			YSFL			CMWA		
ABDU			DOWO			NOPA		
MALL			ATTW			MAWA		
GRSC			BBWO			BLBW		
LESC			PIWO			YEWA		
WWSC			LEFL			CSWA		
BLSC			BHVI			BTBW		
LTDU			PHVI			WPWA		
COGO			REVI			MYWA		
COME			BLJA			BTNW		
RBME			AMCR			CAWA		
COLO			CORA			WIWA		
HOGR			TRES			ATSP		
RNGR			BCCH			CHSP		
DCCO			RBNU			SAVS		
GBHE			BRCR			SOSP		
TUVU			WIWR			SCJU		
BAEA			GCKI			WTSP		
NOHA			RCKI			WCSP		
BWHA			EABL			EWCS		
RTHA			SWTH			GWCS		
RLHA			AMRO			RBGR		
SSHA			AMPI			RWBL		
NOGO			CEDW			COGR		
AMKE			SNBU			BHCO		
MERL			OVEN			BAOR		
PEFA			NOWA			RUBL		
KILL			BAWW			PUFI		
SPSA			TEWA			WWCR		
RBGU			OCWA			CORE		
HERG			NAWA			PISI		
MODO			COYE			EVGR		
RTHU			AMRE			AMGO		

UNDU			High flying warblers	
UNME				
UNGU			Low flying warblers	
UNFL				



TCBO VISIBLE MIGRATION DATA SHEET Date: __ /___ / 20 __

Other obs. | Additional obs. | Tower obs. | Additional/unusual species (from platform during watch): Code/Name | Vis. | Obs.

Notes

Other wildlife:

Insects:

Monarchs Y/ N

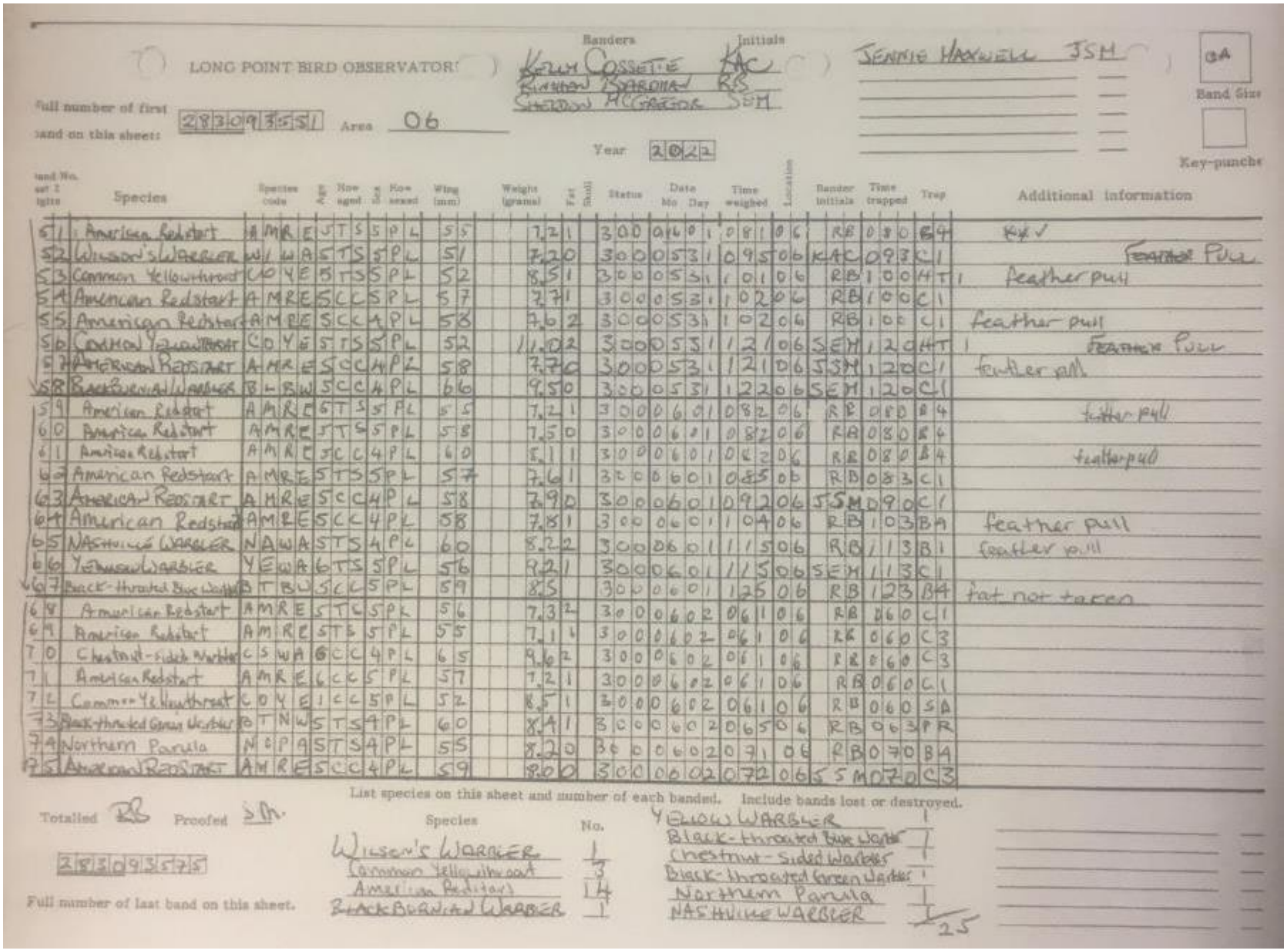
HT Runs HT 1 1 2 3 4 5 6

HT 2 1 2 3 4 5 6

Net/trap open/close information

Dawn Weather		Noon Weather	
Wind direction		Wind direction	
Wind force		Wind force	
Visibility (kms)		Visibility (kms)	
Cloud	/10	Cloud	/10
Temp (C)		Temp (C)	
Precip		Precip	

Figure 4. Banding sheet



LONG POINT BIRD OBSERVATORY

Banders / Initials: Kelly Cossette KAC; Rinsham Barbona? RB; Sheldon McGregor SEM; Jennie Maxwell JSM

Full number of first band on this sheet: 283093551 Area 06

Year 2022

Band Size: 0A

Key-punched

Band No. last 2 digits	Species	Species code	Age	How aged	Sex	How sexed	Wing (mm)	Weight (grams)	Fat	Skull	Status	Date Mo Day	Time weighed	Location	Bander initials	Time trapped	Trap	Additional information
51	American Redstart	AMRE	5	TS	5	PL	55	7.2	1		300	0601	081	06	RB	080	B4	RK ✓
52	Wilson's Warbler	WIWA	5	TS	5	PL	51	7.2	0		300	0531	095	06	KAC	093	C1	Feather Pull
53	Common Yellowthroat	COYE	5	TS	5	PL	52	8.5	1		300	0531	101	06	RB	100	HT1	feather pull
54	American Redstart	AMRE	5	CC	5	PL	57	7.7	1		300	0531	102	06	RB	100	C1	
55	American Redstart	AMRE	5	CC	4	PL	58	7.6	2		300	0531	102	06	RB	100	C1	feather pull
56	Common Yellowthroat	COYE	5	TS	5	PL	52	11.0	2		300	0531	121	06	SEM	120	HT1	Feather Pull
57	American Redstart	AMRE	5	CC	4	PL	58	7.7	0		300	0531	121	06	JSM	120	C1	feather pull
58	Blackburnian Warbler	BLBW	5	CC	4	PL	66	9.5	0		300	0531	122	06	SEM	120	C1	
59	American Redstart	AMRE	6	TS	5	PL	55	7.2	1		300	0601	082	06	RB	080	B4	feather pull
60	American Redstart	AMRE	5	TS	5	PL	58	7.5	0		300	0601	082	06	RB	080	B4	
61	American Redstart	AMRE	5	CC	4	PL	60	8.1	1		300	0601	082	06	RB	080	B4	feather pull
62	American Redstart	AMRE	5	TS	5	PL	57	7.6	1		300	0601	085	06	RB	083	C1	
63	American Redstart	AMRE	5	CC	4	PL	58	7.9	0		300	0601	092	06	JSM	090	C1	
64	American Redstart	AMRE	5	CC	4	PL	58	7.8	1		300	0601	104	06	RB	103	B4	feather pull
65	Nashville Warbler	NAWA	5	TS	4	PL	60	8.2	2		300	0601	115	06	RB	113	B1	feather pull
66	Yellow Warbler	YEWA	6	TS	5	PL	56	9.2	1		300	0601	115	06	SEM	113	C1	
67	Black-throated Blue Warbler	BTBW	5	CC	5	PL	59	8.5			300	0601	125	06	RB	123	B4	fat not taken
68	American Redstart	AMRE	5	TC	5	PL	56	7.3	2		300	0602	061	06	RB	060	C1	
69	American Redstart	AMRE	5	TB	5	PL	55	7.1	1		300	0602	061	06	RB	060	C3	
70	Chestnut-sided Warbler	CSWA	6	CC	4	PL	65	9.6	2		300	0602	061	06	RB	060	C3	
71	American Redstart	AMRE	6	CC	5	PL	57	7.2	1		300	0602	061	06	RB	060	C1	
72	Common Yellowthroat	COYE	1	CC	5	PL	52	8.5	1		300	0602	061	06	RB	060	SA	
73	Black-throated Green Warbler	BTNW	5	TS	4	PL	60	8.4	1		300	0602	065	06	RB	063	PR	
74	Northern Parula	NOPA	5	TS	4	PL	55	8.2	0		300	0602	071	06	RB	070	B4	
75	American Redstart	AMRE	5	CC	4	PL	59	8.0	0		300	0602	072	06	JSM	070	C3	

List species on this sheet and number of each banded. Include bands lost or destroyed.

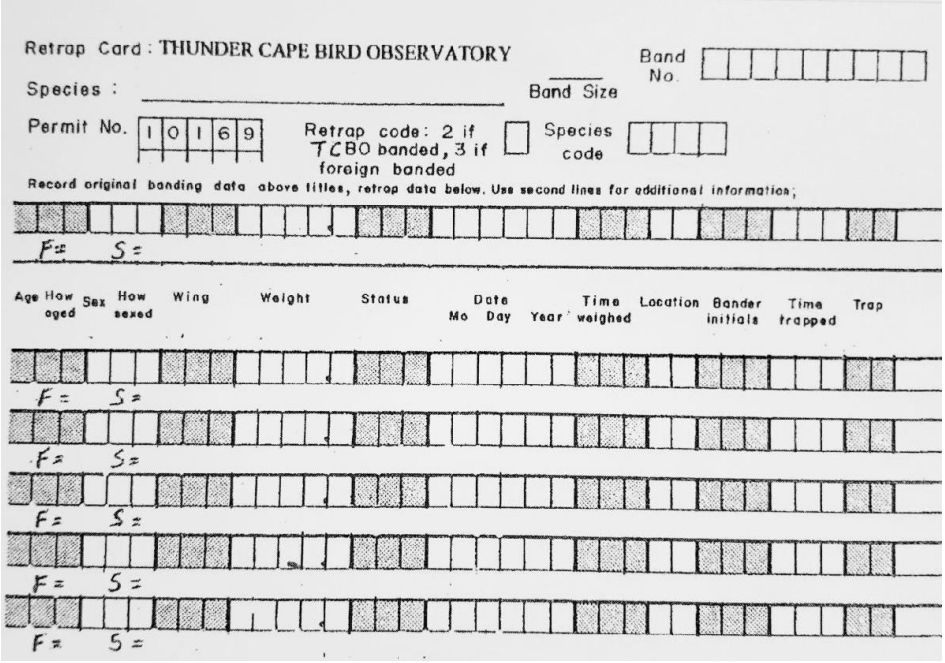
Totalled RB Proofed JSM

Species	No.
Wilson's Warbler	1
Common Yellowthroat	3
American Redstart	14
Blackburnian Warbler	1
Yellow Warbler	1
Black-throated Blue Warbler	1
Chestnut-sided Warbler	1
Black-throated Green Warbler	1
Northern Parula	1
Nashville Warbler	1
	25

283093575

Full number of last band on this sheet.

Figure 5. Retrap form


Retrap Card : THUNDER CAPE BIRD OBSERVATORY

Band No.

Species :

Band Size

Permit No. 1 0 1 6 9

Retrap code: 2 if TCBO banded, 3 if foreign banded

Species code

Record original banding data above titles, retrap data below. Use second lines for additional information;

F= S=

Age How aged | Sex | How sexed | Wing | Weight | Status | Date Mo Day Year | Time weighed | Location | Bander initials | Time trapped | Trap

F= S=

F= S=

F= S=

F= S=

F= S=

F= S=

Figure 6. Casualty record form

Year: _____ Season: _____

Date	Species	Band Number	Details

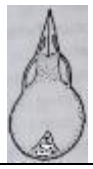
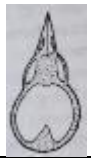
APPENDIX 3. Banding Codes.

Figure 7. Fat score codes

The following numeric codes should be used to record fat content.

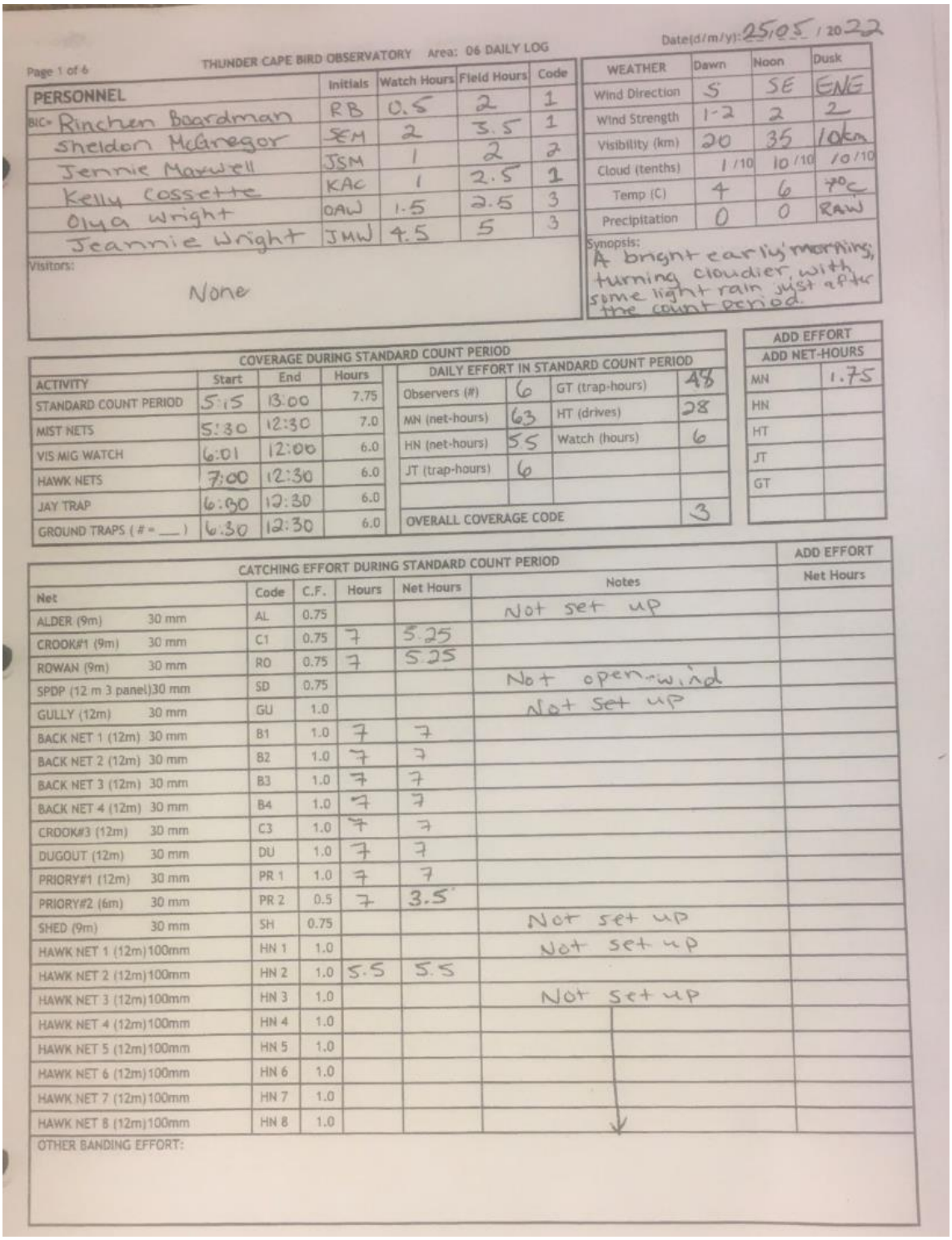
Code	*Description*
1	*No fat in the furculum or anywhere on the body*
2	*The bottom of the furculum is completely covered but the furcular hollow is less than a third full*
3	*The furcular hollow is between one-third and two-thirds full*
4	*The furcular hollow is between two-thirds full and full*
5	*The furculum is more than full with fat bulging slightly from the hollow*
6	*Fat is bulging greatly above the furculum. Large amounts of fat are found under the wing and on the abdomen*
7	*Excessive fat is bulging from the furculum, under-wing and abdomen, so the entire ventral surface of the body is covered*

Figure 8. Codes for Skulling

Numeric Code	Stage of Pneumatization	
1	Trace (less than 5%)	
2	Less than 1/3 but greater than 5%	
3	Half (1/3 to 2/3)	
4	Greater than 2/3 but less than 95%	 
5	Almost complete	 
6	Complete	

APPENDIX 4. Daily Log

Figure 9. Daily Log Form (sample pages)



Page 1 of 6 — THUNDER CAPE BIRD OBSERVATORY — Area: 06 DAILY LOG — Date(d/m/y): 25/05/2022

PERSONNEL	Initials	Watch Hours	Field Hours	Code
BIC- Rinchen Boardman	RB	0.5	2	1
Sheldon McGregor	SM	2	3.5	1
Jennie Maxwell	JSM	1	2	2
Kelly Cossette	KAC	1	2.5	1
Olya Wright	OAW	1.5	2.5	3
Jeannie Wright	JMW	4.5	5	3

Visitors: None

WEATHER	Dawn	Noon	Dusk
Wind Direction	S	SE	ENE
Wind Strength	1-2	2	2
Visibility (km)	20	35	10km
Cloud (tenths)	1/10	10/10	10/10
Temp (C)	4	6	7°C
Precipitation	0	0	RAW

Synopsis: A bright early morning, turning cloudier with some light rain just after the count period.

COVERAGE DURING STANDARD COUNT PERIOD

ACTIVITY	Start	End	Hours
STANDARD COUNT PERIOD	5:15	13:00	7.75
MIST NETS	5:30	12:30	7.0
VIS MIG WATCH	6:01	12:00	6.0
HAWK NETS	7:00	12:30	6.0
JAY TRAP	6:30	12:30	6.0
GROUND TRAPS (# = ___)	6:30	12:30	6.0

DAILY EFFORT IN STANDARD COUNT PERIOD

Observers (#)	6	GT (trap-hours)	48
MN (net-hours)	63	HT (drives)	28
HN (net-hours)	55	Watch (hours)	6
JT (trap-hours)	6		
OVERALL COVERAGE CODE			3

ADD EFFORT — ADD NET-HOURS

MN	1.75
HN	
HT	
JT	
GT	

CATCHING EFFORT DURING STANDARD COUNT PERIOD

Net	Code	C.F.	Hours	Net Hours	Notes	ADD EFFORT Net Hours
ALDER (9m) 30 mm	AL	0.75			Not set up	
CROOK#1 (9m) 30 mm	C1	0.75	7	5.25		
ROWAN (9m) 30 mm	RO	0.75	7	5.25		
SPDP (12 m 3 panel) 30 mm	SD	0.75			Not open-wind	
GULLY (12m) 30 mm	GU	1.0			Not set up	
BACK NET 1 (12m) 30 mm	B1	1.0	7	7		
BACK NET 2 (12m) 30 mm	B2	1.0	7	7		
BACK NET 3 (12m) 30 mm	B3	1.0	7	7		
BACK NET 4 (12m) 30 mm	B4	1.0	7	7		
CROOK#3 (12m) 30 mm	C3	1.0	7	7		
DUGOUT (12m) 30 mm	DU	1.0	7	7		
PRIORY#1 (12m) 30 mm	PR 1	1.0	7	7		
PRIORY#2 (6m) 30 mm	PR 2	0.5	7	3.5		
SHED (9m) 30 mm	SH	0.75			Not set up	
HAWK NET 1 (12m) 100mm	HN 1	1.0			Not set up	
HAWK NET 2 (12m) 100mm	HN 2	1.0	5.5	5.5		
HAWK NET 3 (12m) 100mm	HN 3	1.0			Not set up	
HAWK NET 4 (12m) 100mm	HN 4	1.0				
HAWK NET 5 (12m) 100mm	HN 5	1.0				
HAWK NET 6 (12m) 100mm	HN 6	1.0				
HAWK NET 7 (12m) 100mm	HN 7	1.0				
HAWK NET 8 (12m) 100mm	HN 8	1.0				

OTHER BANDING EFFORT:

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	Band	Rec	Vis	Obs	Oth Obs	KS	ET	Add Band	Add Rec	Add Obs	Twr Obs	DST
Black-and-white Warbler	1			1			2					2
Tennessee Warbler	1			5			6			1		7
Orange-crowned Warbler												
Nashville Warbler	2			10			12					12
Mourning Warbler	5				1		6					6
Common Yellowthroat												
American Redstart	7			16	2		25					25
Cape May Warbler	6			6			12			2		14
Northern Parula				8	1		9					9
Magnolia Warbler	3			8	1		12	1				13
Bay-breasted Warbler	1			3			4					4
Blackburnian Warbler	2			23			25					25
Yellow Warbler	1			11			9					9
Chestnut-sided Warbler	5			20			25					25
Blackpoll Warbler				2	1		3					3
Black-throated Blue Warbler				2			2					2
Western Palm Warbler	1						1					1
"Myrtle" Warbler				9	1		10			1		11
Black-throated Green Warbler	1			4			5					5
Wilson's Warbler	8			7			15					15
Canada Warbler	9			6			15					15
American Tree Sparrow												
Chipping Sparrow	12	3		9		3	24					24
Clay-coloured Sparrow								1				1
Savannah Sparrow												
Song Sparrow				2			2					2
Lincoln's Sparrow												
Swamp Sparrow												
Fox Sparrow												
"Slate-coloured" Junco												
White-throated Sparrow												
Harris's Sparrow												
White-crowned Sparrow												
Eastern White-crowned Sparrow												
Gambell's White-crowned Sparrow												
Scarlet Tanager				1			1					1
Rose-breasted Grosbeak												
Indigo Bunting	3			8			4			4		4
Red-winged Blackbird				3			3					3
Rusty Blackbird												
Common Grackle				1			1					1
Brown-headed Cowbird					1		1	1				1
Baltimore Oriole				1			1					1
Pine Grosbeak												
Purple Finch				3	1		4				1	4
Red Crossbill												
White-winged Crossbill												
Common Redpoll												
Pine Siskin				77	4		40			40		40
American Goldfinch				14			4					4
Evening Grosbeak												
	68						30					31

THUNDER CAPE BIRD OBSERVATORY Area: 06 DAILY LOG Date(d/m/y): 25/02/2022

Unusual Species	Band	Rec	Vis	Obs	Oth Obs	KS	ET	Add Band	Add Rec	Add Obs	Twr Obs	DST
SUMMER TANAGER	1			1			1					1
Unknown Gull sp.			1				1					1
Empidonax sp.				7			7					7
Grey Catbird				1			1					1
Eastern Wood-Pewee				2	1		1					1

DAILY TOTALS	Band	Rec
Total # individuals	95	9
Total # of species	25	3

ET	ADB	ADR
	5	
53	3	

DST
57

Other			Vis	Obs	Oth Obs		Total			Add Obs	Twr Obs	Total
High-flying Warbler spp.	X	X	77				77	X	X			77

DAILY BANDING TOTAL	100

SEASON - TO - DATE BANDING TOTAL	704

ACCUMULATED	
USED	704
DEST	0

Banding data transferred by: RB
Watch data transferred by: JSM
ET/DST totals prepared by: JSM
Data computerized by: _____

Checked by: _____
Checked by: _____
Checked by: _____
Checked by: _____

Date(d/m/y): 25/05/2023 THUNDER CAPE BIRD OBSERVATORY Area: 06 DAILY LOG Page 6 of 6

NARRATIVE (describe migration activity, birding highlights, banding highlights, station management activities, and other noteworthy sightings and events). Underline species names.

Another fine day at the Cape! Our second consecutive day with 100+ birds banded - yay!

The well adorned male Summer Tanager was certainly the highlight (banded).

We also had a Clay-coloured Sparrow and at least 4 Indigo Buntings (3 ba

and 9 Canada Warblers banded.

We said goodbye to Jeanne and Olya who left a lovely surprise chocolate bar ☺.

It rained for a lengthy stretch starting late afternoon but there were still some birds around including Pine Siskins at the feeder, many Chipping Sparrows on the grass, and 3 Olive-sided Flycatchers in the same binocular view - wow!

We also freshened up with a sauna.

More adventures tomorrow.

Signed: Sheldon McGregor

Figure 10. BEAUFORT WIND SCALE

Beaufort Force	Windspeed Knots	Description	Sea Condition
0	0	Calm	Sea like a mirror
1	1 - 3	Light Air	Ripples but without foam crests
2	4 - 6	Light Breeze	Small wavelets. Crests do not break
3	7 - 10	Gentle Breeze	Large wavelets. Perhaps scattered white horses
4	11 - 16	Moderate Breeze	Small waves. Fairly frequent white horses.
5	17 - 21	Fresh Breeze	Moderate waves. many white horses
6	22 - 27	Strong Breeze	Large waves begin to form; white foam crests, probably spray
7	28 - 33	Near Gale	Sea heaps up and white foam blown in streaks along the direction of the wind
8	34 - 40	Gale	Moderately high waves, crests begin to break into spindrift
9	41 - 47	Strong Gale	High waves. Dense foam along the direction of the wind. Crests of waves begin to roll over. Spray may affect visibility
10	48 - 55	Storm	Very high waves with long overhanging crests. The surface of the sea takes a white appearance. The tumbling of the sea becomes heavy and shock like. Visibility affected
11	56 - 63	Violent Storm	Exceptionally high waves. The sea is completely covered with long white patches of foam lying in the direction of the wind. Visibility affected
12	64+	Hurricane	The air is filled with foam and spray. Sea completely white with driving spray. Visibility very seriously affected.

APPENDIX 5. Data submission

All daily effort and observation data collected at TCBO are entered into CMMN software and submitted to Birds Canada, where they are archived and made accessible for research purposes. Data are entered as shown below.

Figure 11. Daily effort database fields. Refers to effort within standard Count Period only

Field Name	Description	Contents
Observ's	Observers	Number of observers contributing to ETs.
Mist Nets	Songbird Nets	Total corrected net-hours for standard nets.
Hawk Net	Non-songbird Nets	Total hawk net hours.
Jay Trap	Jay Trap	Total jay trap hours.
Ground Trap	Other Baited Trap	Total ground trap hours.
HT	Heligoland	Number of Heligoland trap drives.
Watch	Visible Migration	Number of hours of Visible Migration Watch.
Coverage Code	Coverage Code	Overall Coverage code (see Table 5).

Figure 12. Daily bird records database fields.

Field Name	Description	Contents
band	Band	Number of individuals banded during standard Banding Period.
recap	Rec	Number of individuals recaptured during standard Banding Period.
visible	Vis	Number of birds see visibly migrating during standard Visible Migration Count.
obs1	Obs	Number of birds observed (not visibly migrating) during standard Visible Migration Count.
obs2	Oth Obs	Number of birds recorded during Other Observations.
pks	KS	Number of probable known stopovers
Et	ET	Estimated Totals
nsband	Add Band	Number of individuals banded outside the standard Banding Period.
nsret	Add Rec	Number of individuals recaptured outside the standard Banding Period.
obs3	Add Obs	Number of birds observed after the standard Count period (and identified high-flying warblers).
obs4	Twr Obs	Number of birds observed from the Observation Tower.
Dst	DST	Daily Species Total

APPENDIX 6. Personnel and Safety – Rules and Guidelines

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: • handle each bird carefully, gently, quietly, and with respect • capture and process only as many birds as you can safely handle • close traps or nets when there are known predators in the area • do not band in inclement weather • frequently assess the condition of traps and nets and repair them quickly • trainees must be properly trained and supervised • check nets every 20 to 30 minutes • check traps as often as is recommended for each trap type • properly close all traps and nets at the end of the banding day • do not leave traps or nets set and untended • only double-bag non-aggressive birds of the same size and species • use the correct band size and banding pliers for each bird • treat all bird injuries in the most humane way
2.	Banders must continually assess their own work to ensure that it is beyond reproach. • reassess methods and your approach whenever an injury or mortality occurs • accept constructive criticism from other banders
3.	Banders must offer honest and constructive assessment of others' work to help maintain the highest standards possible. • publish innovations in banding, capture and handling techniques • educate prospective banders and trainers • provide feedback of any instances of mistreatment of birds to the BIC • 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.

The following is a summary of the most important policies, rules and guidelines at TCBO. The priority for all TCBO cooperators and visitors is personal safety. If anyone feels that their personal safety is at risk or is about to be put at risk, immediately talk to the BIC, who will take prompt action to resolve the issue. TCBO strives to maintain a safe and healthy workspace free

from harassment, discrimination, and intimidation where everyone is treated with respect and fairness. Any issues addressed will be considered confidential and addressed either by the BIC or Birds Canada.
TCBO's Cardinal Rule: Treat every person (colleague, member of the public, or guest) in a respectful and courteous fashion. Always leave a place (room, kitchen, bathroom, research lab or field site), or thing (equipment, boat, or vehicle) in better condition than when you found it. Please leave the station clean taking all your belongings. All personnel must help with daily clean-up and other chores. The station must be presentable daily and immaculate weekly. Uncooperative or difficult Volunteers will not be welcomed to return.

Communal Living

Communal living is as ubiquitous at TCBO as birds. Cooperators share close quarters with anywhere from one to 8 people at a time. As such, everyone should be equally prepared to cook, clean, organize, and be friendly and courteous with every crew member. Each cooperator staying at TCBO, as a paying guest or long-term, has equal responsibility for the daily upkeep, cleaning, and maintenance of the facilities. Much of what is required should be common sense but, if you are ever uncertain about what could be done, ask the BIC.

General Housekeeping and Maintenance

All cooperators must help keep the station looking exceptionally well-kept daily. Immediately report all facility repairs, equipment breakdowns, supply deficiencies, or any minor problems to the BIC. All TCBO facilities are communal spaces. Please take care of your personal belongings and do not leave them in common areas and be attentive to those with whom you share sleeping quarters.

All lab equipment must be cared for with professional care. The lab and main cabin must be cleaned daily. Management of insects and rodents in all the buildings is most important. A good supply of clean bird bags must be available for use and used bags washed as soon as possible for future use.

The Public and Birds

TCBO is open to the public despite being at a remote location during the seasons of operation. This requires staff and Volunteers to be especially diligent and pragmatic in every aspect of the operation and communication with the public. Our policy and practice are that every visitor needs to be proactively greeted and given a basic explanation of our work. They are not to be ignored or assumed to already know what we are doing. Do not turn your back to visitors in the banding lab, but pivot toward them and explain what you are doing.
Do not allow the public to hold, pet, release or otherwise touch the birds. Do not allow the public to extract birds from the nets. Be polite but firm. Only banders that have been trained or otherwise approved by BIC may touch birds. This also means that experienced banders from other stations who are visiting TCBO may not handle birds until the BIC explicitly says they are

permitted to do so. Remember that TCBO gives hands-off demos only. Emphasize that we are sensitive to the physical and emotional health of the birds we handle and that we do not put them through any more stress than is necessary. Photography of birds in the hand is allowed provided that it doesn't get out-of-hand, stresses the bird or keeps you away from more pressing concerns.
Training of all personnel is undertaken by the BIC or other qualified individuals as time allows for safe operation of the station.
Primary sources of reference material are provided at the station. These include an assortment of field guides, Identification Guide to North American Birds, Identification Guide to European Passerines, W-R-P codes, etc. A copy of the Bander Code of Ethics must be available and shown to all TCBO cooperators.

Safety

Communication and coordination must be undertaken when boat trips are planned with the pilot of the boat and personnel at the station or those within connection on the mainland. At that time, weather and wave conditions and expected arrival and departure times should be discussed. All persons on boat must be supplied with and wear personal floatation devices. Oftentimes the net lanes, shore, and steps at the station can be slippery when wet or frozen. These conditions should be conveyed and observed by/to all personnel. If lightning comes anywhere close to the station observations can be undertaken from the deck in front of the main cabin, or if necessary, inside the cabin at a dedicated window. Those who wish to hike after protocol must speak to the BIC informing them of approximate return time and direction of hike.

Emergency Contact info: Mobile phone access continues to improve but remains limited. More reliable connection for service can be made from the Observation Tower. Rinchen Boardman 613 809 6843, Station Emergency phone 807 252 8147, Sleeping Giant Provincial Park 807 977 2526, Al Harris 807 620 5146, or if the situation warrants 911.