

# Teslin Lake Bird Observatory (TLBO) Field Protocol



Ben Schonewille, Ted Murphy-Kelly & Jukka Jantunen  
Society of Yukon Bird Observatories  
2014 (version 4)

## Table of Contents

1.0	Introduction .....	4
2.0	Objectives.....	4
3.0	Migration Monitoring Methods.....	6
3.1	Count Area .....	6
3.2	Count Period .....	8
3.2.1	Seasonal Count Timing.....	9
3.4	Mist Netting .....	10
3.4.1	Operating Guidelines .....	10
3.4.2	Banding .....	14
3.5	Visible Migration Count .....	14
3.5.1	Watch Location .....	16
3.6	Other Observations.....	16
3.7	Estimated Totals (ETs).....	16
3.8	Overall Coverage Codes .....	17
3.9	Additional Observations.....	18
4.0	Data Entry .....	18
5.0	Personnel .....	18
6.0	Vegetation Management.....	19
7.0	Literature Cited .....	20

## List of Figures

Figure 1. Map of the Yukon, showing the location of TLBO. ....	7
Figure 2. Map of Teslin Lake Bird Observatory count area (marked by purple line).....	8
Figure 3. TLBO mist net array.....	12

## List of Tables

Table 1. Priority landbird species for monitoring at Teslin Lake Bird Observatory. ....	5
Table 2. TLBO mist net specifications. ....	11
Table 3. Observer skill levels. ....	17
Table 4. Criteria for assigning daily coverage codes. ....	17

## 1.0 Introduction

The Teslin Lake Bird Observatory (TLBO) was established in the spring of 2005 by Ben Schonewille and Ted Murphy-Kelly with assistance from a number of agencies including the Teslin Renewable Resources Council, Canadian Wildlife Service, Yukon Environment and the Yukon Conservation Society. For 2005, the station was located along the shore of Nisutlin Bay, however; land tenure issues caused the station to relocate to the current location at Ten Mile Point on Teslin Lake. Over the period of 2006 to 2008, the station operated during the spring season with varying amounts of effort (typically 25 – 35 days of operation per year). Prior to 2008, the station operated very sporadically during the fall season, however; in 2008 the station operated daily during the fall migration season and has continued annual operation since.

Along with the Albert Creek Bird Observatory, TLBO is currently seeking full membership within CMMN (Canadian Migration Monitoring Network). Situated along Teslin Lake (60.231° N, 132.916° W) in the south-central Yukon, TLBO offers an ideal location to monitor the migration of landbirds, raptors, waterbirds and possibly waterfowl breeding north of the observatory throughout the Yukon and Alaska. Migration monitoring methods at Teslin Lake follow procedures recommended by the North American Migration Monitoring Council and are similar to methods used elsewhere (Wojnowski et al 2000, Gahbauer and Hudson 2004). This protocol provides a description of field procedures currently in practice at ACBO with the possibility of revisions to be made should additional components (e.g. owl banding, species specific monitoring using call playback) be added to the protocol in the future. It is intended that this protocol should enable personnel, even if unfamiliar with the site, to collect data that is consistent with current procedures.

## 2.0 Objectives

The primary objectives of Teslin Lake Bird Observatory are as follows:

- Collect standardized migration monitoring data to allow for trend analysis of landbird populations in the Yukon.
- Collect baseline data on the distribution and migration timing of bird species in the south-central Yukon.
- Provide an opportunity for the public (especially students) to learn about the birdlife of the Yukon, their migration habits and ornithological data collection.

A secondary objective of the observatory is to collect data to calculate trends in populations of shorebirds, waterbirds and waterfowl based on the collection of migration monitoring data.

High priority landbird species for monitoring at Teslin Lake are shown in Table 1. Species prioritization follows that of Badzinski and Francis (2000). Species shown in **red bold** are those which meet the minimum criteria in Badzinski and Francis (2000) for species trend analysis during the spring and/ or fall season; at least 10 individuals are observed on a least 5 days per year. Species shown in **bold** are additional priority species based on their regional importance at TLBO. These species are at the extreme northern limit of their range and TLBO is in a unique position to monitor these species in the Yukon, despite relatively low numbers encountered.

**Table 1.** Priority landbird species for monitoring at Teslin Lake Bird Observatory (not that there are no priority ‘E’ and ‘F’ species which occur regularly at TLBO).

Priority ‘A’	Priority ‘B’	Priority ‘C’	Priority ‘D’
<b>Alder Flycatcher</b>	American Tree Sparrow	<b>American Redstart</b>	<b>American Robin</b>
<b>American Pipit</b>	<b>Boreal Chickadee</b>	Bank Swallow	<b>Black-capped Chickadee</b>
<b>Blackpoll Warbler</b>	<b>Bohemian Waxwing</b>	Barn Swallow	Belted Kingfisher
Gray-cheeked Thrush	<b>Common Redpoll</b>	Chipping Sparrow	Cedar Waxwing
Lincoln’s Sparrow	<b>Dark-eyed Junco</b>	Cliff Swallow	Downy Woodpecker
<b>Northern Waterthrush</b>	Fox Sparrow	Common Nighthawk	Hairy Woodpecker
<b>Orange-crowned Warbler</b>	Lapland Longspur	Common Yellowthroat	Hermit Thrush
<b>Savannah Sparrow</b>	<b>Myrtle Warbler</b>	Dusky Flycatcher	Northern Flicker
Swainson’s Thrush	Northern Shrike	Hammond’s Flycatcher	<b>Pine Siskin</b>
Tennessee Warbler	<b>Pine Grosbeak</b>	Least Flycatcher	Purple Finch
<b>Wilson’s Warbler</b>	<b>Ruby-crowned Kinglet</b>	<b>MacGillivray’s Warbler</b>	Red-breasted Nuthatch
<b>Yellow-bellied Flycatcher</b>	<b>Rusty Blackbird</b>	Olive-sided Flycatcher	Townsend’s Solitaire
	<b>Varied Thrush</b>	Say’s Phoebe	
	White-crowned Sparrow	<b>Townsend’s Warbler</b>	
	<b>White-winged Crossbill</b>	Tree Swallow	
		Violet-green Swallow	
		Warbling Vireo	
		<b>Western Tanager</b>	
		Western Wood-Pewee	
		<b>Yellow Warbler</b>	

- A. Species with <50% of North American (Canada and USA only) breeding range covered by BBS, and <60% of their winter range in USA and Canada.
- B. Species with <50% of North American breeding range covered by BBS, but >60% of their winter range in the USA and Canada.
- C. Species with <60% of their Canadian and Alaskan breeding range (but >50% of North American range) covered by BBS, but <60% of their winter range in USA and Canada.
- D. Species with <60% of their Canadian and Alaskan breeding range (but >50% of North American range) cover by BBS, but >60% of their winter range in USA and Canada.
- E. Species with >60% of both their Canadian and North American breeding range covered by BBS, and <60% of their winter range in USA and Canada.
- F. Species with >60% of both their Canadian and North American breeding range covered by BBS, and >60% of their winter range in USA and Canada.

Although no such prioritization framework currently exists for raptors, this group of birds is a priority for the observatory, particularly through the visible migration counts. The species shown in Table 2 represent the priority species for monitoring at TLBO; high priority species are those observed in sufficient numbers to calculate long term species trends. Low priority species include those observed annually in low numbers or sporadically between years.

**Table 2.** Priority raptor species for monitoring at Teslin Lake Bird Observatory.

High Priority	Low Priority
Bald Eagle	Northern Goshawk
Northern Harrier	Swainson’s Hawk
Sharp-shinned Hawk	Merlin
Harlan’s Red-tailed Hawk	Peregrine Falcon
Rough-legged Hawk	Gyr Falcon
Golden Eagle	
American Kestrel	
Osprey	

### 3.0 Migration Monitoring Methods

#### 3.1 Count Area

Teslin Lake Bird Observatory is located on the east shore of Teslin Lake, approximately 15 km northwest of the community of Teslin (Figure 1). The boundary of the count area is shown by a purple line in Figure 2. The count area is delimited by the Alaska Highway to the east and Teslin Lake to the west. The north boundary is 10 Mile Creek which crosses the Alaska Highway and flows into Teslin Lake just to the north of the observatory. The total area of the count area is approximately 0.12 km<sup>2</sup> (12 ha). The count area encompasses Ten Mile Point and includes the Yukon Government’s Teslin Lake Campground. Any birds seen or heard by observers, who are within the count area during the count period, may be included in observations contributing to the estimated total, regardless of whether the birds are within the count area or not. All birds on or over the lake, whether seen by naked eye or with the assistance of optics, are countable if the observer is within the boundaries of the count area.



Figure 1. Map of the Yukon, showing the location of TLBO.



**Figure 2.** Aerial view of the Teslin Lake Bird Observatory count area (marked by purple line; note that water levels are very high during the early summer as shown in the photo above).

### 3.2 Count Period

The daily count period for the estimated totals starts 15 minutes before sunrise and is rounded back to the nearest quarter or an hour (ex – 520 sunrise rounds to 515 start). The duration of the daily mist-netting activities is, conditions permitting, 6 hours, from the opening of the first net to closing the first net (sunrise plus 6 hours) and shall begin 15 minutes after the start of the count period. The remaining time within the daily count period will include a 1 hour migration watch. The actual duration of the daily count period may vary on a day to day basis due to the 1 hour watch to be completed following the closure of the mist nets and the subsequent processing of birds captured. A daily schedule of the standard start and end times of the count period during the spring and fall season is shown in Appendix 1.

The standard count period timing may be moved back by up to 3 hours due to unfavorable weather conditions including rain/snow or cold temperatures. When this occurs, a full scale 6 hour mist netting effort is allowed. In the event that the station is opened later than the



scheduled start time and is not attributed to weather, the only effort which is considered standard is that which extends up to the scheduled count period end. In these instances, a minimum of 3 hours of netting effort is required to be considered standard otherwise the entire effort for the particular day will be considered non-standard.

Some examples of how the standard/non-standard count periods are shown below using an example of September 1<sup>st</sup>; the predetermined count period start for this date is 630 with the net opening and closing being 645 and 1245, respectively.

- Count period starts at 630, nets opened at 645 and closed at 1245, birds are then processed, a 1 hr visual count is conducted and the count period ends at 1400.
  - Standard Count Duration = 7.5 hrs
  - Non-Standard Count Duration = 0 hrs
  - Standard Mist Netting Effort = 6.0 hrs
  - Non-Standard Mist Netting Effort = 0 hrs
- Count period starts at 630, nets opened at 645 and closed at 1445, birds of the 1245 net round are processed at a one hour watch is conducted and finished as 1400. Birds from the 1445 net closing round are banded and the count period ends at 1530.
  - Standard Count Duration = 7.5 hrs
  - Non-Standard Count Duration = 1.5 hrs
  - Standard Mist Netting Effort = 6.0 hrs
  - Non-Standard Mist Netting Effort = 2.0 hrs
- Raining at 630; however, rain ends at 800. Nets opened at 830 and closed at 1430. After the final net round, a 1 hr visual count is done and completed at 1600. An additional 1.5 hr visual count is done and the count period ends at 1730.
  - Standard Count Duration = 7.5 hrs
  - Non-Standard Count Duration = 1.5 hrs
  - Standard Mist Netting Effort = 6.0 hrs
  - Non-Standard Mist Netting Effort = 0 hrs

### **3.2.1 Seasonal Count Timing**

The core timing of the standardized fall count period will be July 25 to October 20 with September 30 being the cut-off date for the primary mist netting period. The period from September 30 to October 20 primarily includes the visible migration counts; however, non-standard mist netting may also be conducted during this time period as weather conditions allow.

### **3.4 Mist Netting**

One qualified bander must be designated as the bander-in-charge (BIC) at all times. The BIC is responsible for ensuring that mist netting and banding is conducted safely and in accordance with this protocol. In order for any capture or banding to take place, a licensed bander **must** be on site and have the Master Bander’s banding permit on hand.

The standard mist netting period extends for 6 hours starting at official sunrise (rounded back to the nearest quarter of an hour; see Appendix 1). At Teslin Lake, the sole method of capturing birds for the purposes of banding is through the use of passerine mist nets.

#### **3.4.1 Operating Guidelines**

All mist nets used should be 30 mm, black mesh, 75d/2 ply thread, and tethered. All nets are set on guyed, 3 m high poles.

##### **3.4.1.1 Fall Season**

The standard mist net array for the fall season is shown in Figure 3. Mist net specifications are detailed in Table 3. In addition to these nets, non-standard nets are allowed but must be indicated as such on all effort and species estimated total sheets. For example, nets may be useful to target specific species (such as Rusty Blackbird) or to test innovative capture techniques such as canopy nets.

**Table 3.** TLBO mist net specifications.

Net #	Length	Height	# of Panels	CF
1	12 m	2.75 m	4	1
2	12 m	2.75 m	4	1
4	12 m	2.75 m	4	1
5	12 m	2.75 m	4	1
6	12 m	2.75 m	4	1
7	12 m	2.75 m	4	1
8	12 m	2.75 m	4	1
9	12 m	2.75 m	4	1
10	12 m	2.75 m	4	1
11	12 m	2.75 m	4	1
14	12 m	2.75 m	4	1
15	12 m	2.75 m	4	1
16	12 m	2.75 m	4	1
17	12 m	2.75 m	4	1
18	12 m	2.75 m	4	1
20	12 m	2.75 m	4	1
25	12 m	2.75 m	4	1
26	12 m	2.75 m	4	1
27	12 m	2.75 m	4	1
28	18 m	2.75 m	4	1.5
29	12 m	2.75 m	4	1
30	12 m	2.75 m	4	1

CF = Correction Factor. To determine net hours, a 12 meter - 4 panel net is counted as 1 net and an 18 m – 4 panel net is counted as 1.5 net.



Figure 3. TLBO mist net array.

A total of 22 mist nets may be used on a daily basis (see Table 2). The opening and closing of nets shall be conducted in the same order each day and should begin at the banding & observation site and progress in a northward direction along the net loop. The number of nets used on a daily basis shall be determined by a number of factors including; number of qualified personnel onsite, bird activity and weather. The core group of 13 nets which shall be used on a daily basis as conditions allow include the following; 4, 6, 7, 8, 9, 10, 11, 14, 15, 18, 16, 17 and 20. Additional mist nets should be opened when conditions allow and should be done so at the discretion of the BIC. In the advent of unfavorable weather or a backlog of birds, all mist nets should be closed until the backlog of birds is processed or the weather improves. Should birds be released unbanded due to an excessive backlog of birds or other reason, the number of individuals should be recorded as “obs” on the daily log sheet. The number (and species) of birds should also be recorded in the daily narrative and entered accordingly in the observatory database.

Only the standard nets should be operated during the standard period, with the exception of experimental canopy nets and/or species specific nets. Exceptions may be made in order to catch and document a rare bird or where the trapping involves non-target species (e.g. shorebirds) and does not affect the standard program. Birds caught during the standard period in non-standardized nets or traps (e.g. shorebird trap, by hand, etc.) must be denoted as NSB (non-standard banding) in the comments column on the banding sheets. These birds are, however, included in the regular band column on the Daily Log and do contribute to the ET.

Additional passerine netting after the normal closure time may be done at the discretion of the bander-in-charge. New bandings and recaptures outside of the standard Banding Period are denoted as NSB on the banding/recapture data sheets and entered into the NSB Band and NSB Recap columns of the daily log sheet. Any non-standard netting or trapping effort should be recorded on the daily log sheet, even if no birds are captured.

Attracting birds to the count area by any means (seed/suet etc) is not permitted except for the following exceptions:

- Nocturnal audio-luring of owls is permitted during testing of the site for monitoring owls.
- The testing of using audio lures to target specific target species, such as finches or woodpeckers at mist nets 5, 25, 26 and 27.

Should either of the above activities prove to be feasible at TLBO, future refinements to this protocol will be made.

### 3.4.2 Banding

All banding shall be conducted in adherence to the North American Bird Banding Manual (Gustafson et al 1997) and all aging and sexing of birds shall be made using the Identification Guide to the Identification Guide to North American Birds (Pyle 1997). Refer to Appendix 2 (field manual) for additional detail regarding the collection of banding data.

**The safety of birds should be utmost importance during the mist netting and banding activities at TLBO.**

Should any birds show signs of excessive stress upon extraction, they should be released immediately at the net and recorded within the “Obs” column of the daily log sheet. In the event that birds are released unbanded, the number (and species) of birds should also be recorded in the daily narrative and entered accordingly in the observatory database.

Data sheets to be used include the following: Original Banding Sheet, Recapture Sheet and Molt Sheet (see Appendix 3).

### 3.5 Visible Migration Count

A series of visible migration watches (i.e., the watches) will be conducted as part of the daily count period at TLBO. Due to problems associated with having a sufficient number of qualified observers, the watches are designed to allow the primary observer (typically the Bander-in-Charge) to carry out the mist netting and banding activities simultaneously.

An extensive (4-6 hour) watch is not typically possible at TLBO due to the usually limited number of qualified observers. Therefore a number of shorter duration watches will be conducted throughout the count period. Rather than identify a predetermined visual count effort on an hourly basis (which may not be possible at times due to high mist net captures), the guideline for the visual counts is to conduct as much visual counting as possible during the count period. In addition to the visual counts during the mist netting period, a 1 hour watch should be carried out following the completion of the day’s mist netting / banding activities (when possible). The birds counted for each watch shall be separated and indicated as such on the “Visual Counts Field Data Sheet”. On the data sheets, all counts shall be scribed as starting at the top of the hour. For example, if a count is started at 945, the birds seen up until 959 are

recorded under the 900 watch period with 15 minutes of effort and a new period shall be started at 1000 and progress as long as 1059, when a new (1100) period shall be started.

The watch timing / effort and a tally of all birds seen should be recorded on the daily log sheet (Appendix 4). Note that all birds seen during a watch shall be designated as either visual migrants (“vis”) or observed (“obs”) on the field tally sheet.

Typically, the watch will be completed by a single individual, however; should additional personnel be involved in the watch, one person shall be designated as the lead observer. The lead observer will typically be the most experienced observer and all data will be recorded under supervision of the lead observer.

The watch data are to be collected independently of other survey / banding activities at the station. In other words, any birds classified as “vis” cannot be recorded in other Estimated Totals categories.

To assign individual birds or flocks of birds as visual migrants (vis) , the observer is required to use reasonable judgment, however; the following guidelines will aid in making the determination.

- Any birds flying along (or over) Teslin Lake without stopping shall be considered "vis" (this is typically in a southward direction but may also be in other directions).
- In the case of small passerines, individuals seen moving through the vegetation at a fairly steady pace without prolonged periods of stopover shall be considered "vis".
- Birds (typically small passerines such as warblers) observed landing at the point, and leaving shortly after shall be considered 'vis" despite stopping briefly as many birds will stop briefly at the point prior to flying out over the water or continuing along the lakeshore.
- Any birds observed “dropping in” to the point and not leaving shortly after shall not be considered "vis".

Unidentified flycatchers, thrushes, sparrows, vireos and warblers should be recorded as such while conducting the visual counts. In the case of similar species in which a species specific identification cannot be determined, it is acceptable to record them as a combination of species. An example would be American Robin / Varied Thrush which in some instances can be difficult to identify. On the visual count data sheet, the number of birds observed should be recorded as visual migrants (“vis”).

### **3.5.1 Watch Location**

All watches should be conducted from the sparsely vegetated location at the tip of the point immediately adjacent to the banding table. At the watch location, there are two primary viewing avenues at which to observe migrating birds. First, viewing towards the west (over the lake) typically yields the majority of waterfowl, waterbird and shorebird migrants over the lake itself and also low numbers of raptors travelling along the far shore. Second, viewing towards the east (over the land) yields the vast majority of landbird and raptor migrants. The watch effort should be split between the two viewing avenues, however; on days when the larger proportion of birds are following either avenue, the effort should be split accordingly. An approximation of the proportion of each watch shall be included on the appropriate data sheet (Appendix 4).

### **3.6 Other Observations**

All birds that are observed during the count period, but are not included in the visible migration counts should be recorded in the other observations column (“Obs”) in the daily log. Opportunistic sightings of birds observed in migration flight shall also be included separately and recorded as “Oth Vis” in the daily log.

These include birds observed during net-rounds, and any other observations from within the count area outside of the visual migration watches. Other observations should be noted by the personnel onsite on the appropriate daily log sheet (Appendix 4).

### **3.7 Estimated Totals (ETs)**

The Estimated Total (ET) is the best estimate of the number of individuals of each species detected in the count area during the standard count period. All personnel involved in the respective day’s activities shall share their observations with the BIC and help him/her to arrive at the ETs.



### 3.8 Overall Coverage Codes

Each day, an overall coverage code, ranging from 0 to 5, is assigned based on the actual effort during the count period (7.5 hours after sunrise) that day. The coverage code takes into consideration the number of observers and their skill levels (Table 3), as well as the overall counting and mist netting effort. The coverage codes and the criteria used to assign them, are described in Table 4. For the code to be assigned, **all the listed criteria must be met**. The aim should be to achieve Code 3 coverage as frequently as possible.

**Table 4.** Observer skill levels.

Class	Criteria
1	Able to identify over 90% of birds encountered.
2	Able to identify 75 to 90% of birds encountered.
3	Able to identify 50 to 75% of birds encountered.
4	Able to identify less than 50% of birds encountered.

**Table 5.** Criteria for assigning daily coverage codes.

Code	Coverage	Criteria
0	No coverage	
1	Casual	Casual observations and/or banding. Very limited or no visible migration count
2	Poor	At least 1 Class 2 observer active throughout count period; variable amount of visible migration count effort; no or limited mist netting effort.
3	Fair	At least 1 Class 2 observer active throughout count period; 1.5 hrs visible migration count; mist netting may have been restricted by weather (maximum 78 corrected net hrs).
4	Good	At least 1 Class 2 observer active throughout count period; 2.0 hrs visible migration count (after August 15); at least 78 corrected net hrs unless reduced due to backlog of birds (before Sept 30).
5	Excellent	At least 1 Class 1 and 1 Class 2 observers active throughout count period; at least 3.0 hrs visible migration count (after August 15); over 78 corrected net hrs unless reduced due to backlog of birds (before Sept 30).

### **3.9 Additional Observations**

The daily species total (DST) reflects the total number of birds of each species seen or heard in the area during the course of the entire day. The DST is determined by combining all birds encountered during the standard (Estimate Total) and non-standard monitoring data. Although not as standardized as the daily ET, the daily species total serves to record species detected outside the daily count period and also makes use of observations made later into the day by the observatory's personnel and volunteers.

### **4.0 Data Entry**

The TLBO standard is to that all estimated total data will on an annual basis, be entered into the most current version of the CMMN's DET software. All other data will be entered in the Yukon Bird Observatories' Microsoft Excel / Access database. All applicable banding data will be provided to Environment Canada's Bird Banding Office on a yearly basis in a timely manner. Aside from data submission to Environment Canada to fulfill permit obligations, all relevant data will be provided to the Canadian Wildlife Service (Whitehorse) and the Yukon Bird Club for inclusion in seasonal bird sighting summaries, etc.

### **5.0 Personnel**

At least two qualified people are required to obtain excellent coverage (code 5, Table 4) at TLBO, however; this protocol has been developed to allow for a lone qualified individual to achieve fair to good coverage during periods of favorable weather. It is understood that more than one qualified individual onsite would be the preferred option as is typically the case at other bird observatories. However, due to the relatively low number of qualified people in the Yukon, additional qualified personnel cannot be assured. Should the observatory be staffed by a lone individual, it is essential that the individual be a qualified and competent bander, and preferably also one with the identification skills to conduct migration watches.

All new personnel must familiarize themselves with the protocol. The BIC, generally the most experienced bander at the station, is responsible for overseeing all aspects of operations including trapping and data recording. Training and supervision of new personnel should be done solely by the BIC or by a person designated by him/her. All persons are expected to

participate in the routine maintenance of the station. The station manager is typically responsible for station setup/closure and data management/reporting duties.

## **6.0 Vegetation Management**

TLBO is located within the riparian influence (within the high water mark) of Teslin Lake and the site is subject to annual flooding during the spring and early summer months (late May to late June) due to the rapid melt of high elevation snowpack within the watershed. This annual flooding has a strong influence on the natural succession of vegetation onto the beach within the count area. As such, there are very few trees within the actual mist netting area except for along the margins where nets 5, 25 and 26 are located. However, vegetation management is not a concern for these nets as they are intended as “understory nets” to capture species in such habitats (ie, thrush). In addition, the annual flooding and movement of gravel along the shoreline limits the growth of woody vegetation within the netting area. The only vegetation management required at TLBO is the annual clearing of net lanes; primarily the removal of grasses and material deposited within the net lanes due to the spring flooding. To track changes in vegetation height and composition within the netting area, photographs are taken of all net lanes on an annual basis.

## 7.0 Literature Cited

- Badzinski, D.S. and C. M. Francis. 2000.** An evaluation of species coverage by the Canadian Migration Monitoring Network. Prepared by Bird Studies Canada.
- Gahbauer, M.A. and M.-A. R. Hudson. 2004 (revised 2007).** McGill Bird Observatory Field Protocol for Migration Monitoring Program.
- Gustafson, M. E., J. Hildenbrand and L. Metras. 1997.** The North American Bird Banding Manual (Electronic Version). Version 1.0
- Milko, R., L. Dickson, R. Elliot and G. Donaldson. 2003.** Wings over water: Canada's waterbird conservation plan. Prepared by Environment Canada (Canadian Wildlife Service).
- Pyle, P. 1997.** Identification Guide to North American Birds – Part 1 (*Columbidae to Ploceidae*). Slate Creek Press, Bolinas, California.
- Wojnowski, J.K., G.C. Gibson, A.E. Heagy, B.J. Rodrigues and D.J.T. Hussell. 2000.** Field Protocol for Migration Monitoring at Thunder Cape Bird Observatory. Prepared for Ontario Ministry of Natural Resources.

**Appendix 1**  
**DAILY COUNT TIMING**

Date	Sunrise	Count Period Start Time	Mist Net Open	Mist Net Close	Count Period End (Approximate)
23-Jul	511	445	500	1100	1230
24-Jul	513	445	500	1100	1230
25-Jul	515	500	515	1100	1230
26-Jul	517	500	515	1115	1245
27-Jul	519	500	515	1115	1245
28-Jul	521	500	515	1115	1245
29-Jul	524	500	515	1115	1245
30-Jul	526	500	515	1115	1245
31-Jul	528	500	515	1115	1245
01-Aug	531	515	530	1130	1300
02-Aug	533	515	530	1130	1300
03-Aug	536	515	530	1130	1300
04-Aug	538	515	530	1130	1300
05-Aug	540	515	530	1130	1300
06-Aug	543	515	530	1130	1300
07-Aug	545	530	545	1145	1315
08-Aug	548	530	545	1145	1315
09-Aug	550	530	545	1145	1315
10-Aug	553	530	545	1145	1315
11-Aug	555	530	545	1145	1315
12-Aug	557	530	545	1145	1315
13-Aug	600	545	600	1200	1330
14-Aug	602	545	600	1200	1330
15-Aug	605	545	600	1200	1330
16-Aug	607	545	600	1200	1330
17-Aug	610	545	600	1200	1330
18-Aug	612	545	600	1200	1330
19-Aug	614	545	600	1200	1330
20-Aug	617	600	615	1215	1345
21-Aug	619	600	615	1215	1345
22-Aug	622	600	615	1215	1345
23-Aug	624	600	615	1215	1345
24-Aug	627	600	615	1215	1345
25-Aug	629	600	615	1215	1345
26-Aug	631	615	630	1230	1400
27-Aug	634	615	630	1230	1400
28-Aug	636	615	630	1230	1400
29-Aug	639	615	630	1230	1400
30-Aug	641	615	630	1230	1400
31-Aug	643	616	630	1230	1400
01-Sep	646	630	645	1245	1415
02-Sep	648	630	645	1245	1415
03-Sep	651	630	645	1245	1415
04-Sep	653	630	645	1245	1415
05-Sep	655	630	645	1245	1415
06-Sep	658	630	645	1245	1415

Date	Sunrise	Count Period Start Time	Mist Net Open	Mist Net Close	Count Period End (Approximate)
07-Sep	700	645	700	1300	1430
08-Sep	702	645	700	1300	1430
09-Sep	705	645	700	1300	1430
10-Sep	707	645	700	1300	1430
11-Sep	710	645	700	1300	1430
12-Sep	712	645	700	1300	1430
13-Sep	714	645	700	1300	1430
14-Sep	717	700	715	1315	1445
15-Sep	719	700	715	1315	1445
16-Sep	721	700	715	1315	1445
17-Sep	724	700	715	1315	1445
18-Sep	726	700	715	1315	1445
19-Sep	728	700	715	1315	1445
20-Sep	731	715	730	1330	1500
21-Sep	733	715	730	1330	1500
22-Sep	736	715	730	1330	1500
23-Sep	738	715	730	1330	1500
24-Sep	740	715	730	1330	1500
25-Sep	743	715	730	1330	1500
26-Sep	745	730	745	1345	1515
27-Sep	747	730	745	1345	1515
28-Sep	750	730	745	1345	1515
29-Sep	752	730	745	1345	1515
30-Sep	754	730	745	1345	1515
01-Oct	757	730	745	1345	1515
02-Oct	759	730	745	1345	1515
03-Oct	801	745	800	1400	1530
04-Oct	804	745	800	1400	1530
05-Oct	806	745	800	1400	1530
06-Oct	808	745	800	1400	1530
07-Oct	811	745	800	1400	1530
08-Oct	813	745	800	1400	1530
09-Oct	815	800	815	1415	1545
10-Oct	818	800	815	1415	1545
11-Oct	820	800	815	1415	1545
12-Oct	823	800	815	1415	1545
13-Oct	825	800	815	1415	1545
14-Oct	827	800	815	1415	1545
15-Oct	830	815	830	1430	1600
16-Oct	832	815	830	1430	1600
17-Oct	835	815	830	1430	1600
18-Oct	837	815	830	1430	1600
19-Oct	840	815	830	1430	1600
20-Oct	842	815	830	1430	1600
21-Oct	845	830	845	1445	1615

**Appendix 2**  
**FIELD MANUAL**



Teslin Lake Bird Observatory  
Field Manual

## Table of Contents

1.0	Introduction .....	3
2.0	Data Collection.....	3
3.1	Daily Log Sheet.....	3
3.2	Banding Sheet .....	5
3.3	Recapture Sheet.....	8
3.4	Molt Sheet.....	8

## 1.0 Introduction

The purpose of this field manual is to provide the field crew members of TLBO with a guide with which to collect data during the spring and fall migration seasons. This manual will deal primarily with the daily log sheets and the banding sheets to explain how the data shall be collected and scribed onto the respective data sheets.

## 2.0 Data Collection

### 2.1 Daily Log Sheet

The personnel and visitors section shall be filled out in the field to ensure accurate times are recorded. Additionally, all times shall be recorded to the nearest 5 minute interval.

The following outlines the scoring system used to collect weather data.

Wind Direction – record as N, NE, E, SE, S, SW, W or NW prevailing wind direction

Wind Strength – shall be recorded using the Beaufort Scale as outlined in the table below

Scale	Ground Speed (km/h)	Description	Specifications
0	0 – 2	Calm	Smoke rises vertically.
1	2 – 6	Light air	Direction of wind shown by smoke drift.
2	6 – 11	Light breeze	Wind felt on face, leaves rustle.
3	10 – 19	Gentle breeze	Leaves and small twigs in constant motion.
4	19 – 30	Moderate breeze	Raises dust and loose paper, small branches moved.
5	30 - 39	Fresh breeze	Small trees in leaf begin to sway, crested wavelets form on inland waters.
6	39 - 50	Strong breeze	Large branches in motion, umbrellas used with difficulty.
7	50 - 61	Near gale	Whole trees in motion, inconvenience felt when walking into the wind.
8	61 - 74	Gale	Twigs break off of trees, generally impedes progress.
9	74 - 87	Severe gale	Slight structural damage
10	87 - 100	Storm	Rare inland, trees uprooted, considerable structural damage,

Visibility – shall be recorded as accurately as possible using the following landmarks as a guide

- Gull Nesting Island – 2.4 km
- Microwave Tower – 6 km
- Mt. Bryde – 28 km
- Dawson Peaks – 35 km

Cloud Cover – approximation to the nearest 10%

Temperature – measured to the nearest degree

Precipitation – shall be recorded using the following codes

0 = None	0 = None
1 = Trace rainfall	1S = Trace snowfall (few flurries)
2 = Light rainfall (drizzle)	2S = Light snow flurries
3 = Moderate, steady rainfall	3S = Moderate snowfall
4 = Heavy Rain	4S = Heavy snowfall

On page 2 of the daily log sheet, any rare birds and bird injuries/mortalities should be recorded in the respective space. The daily narrative should be filled out at the end of each day's activities and may include a synopsis of the day's activities including a brief synopsis of bird migration. Also to be included are any interesting notes regarding visitors or station maintenance activities.

For the mist net and visual watch data sheets, all times should be recorded as accurately as possible. For the opening and closing of nets, the time the first net was open / closed shall be recorded for all corresponding nets. This will provide an accurate count of mist net effort so long as the nets are opened and closed in the same order.

On both the visual migration watch and incidental observation data sheets, all observations should be recorded as soon as possible in the tally section. And the end of the daily count, all tallies shall be summed and recorded in the appropriate box. Upon summation of the observation data, this information can be scribed on the ET species tables along with the day's banding and recapture data. Note that all observers from each day should be involved in the estimation of the day's ET data.

## 2.2 Banding Sheet

The following explains the methods for data collection involving the primary banding sheet.

**Banders** – be sure to include the full name and initials for each bander on the respective banding sheet.

**Band Numbers** – take extreme care to ensure the first and last band numbers are recorded correctly on the banding sheet. At the start and finish of each page, be sure to scribe the full band number legibly.

**Species** – record the 4 letter code for the respective species. Should the same species follow the first scribing of the species code, then do not rewrite the codes. In such instances, a line should be written through the species box to ease later data entry. An exception to this rule is the first bird of the day (on each banding sheet) which should always be rewritten regardless of whether or not the last bird of the previous day was the same species.

**Net** – the net number should be recorded for all birds captured. Upon extraction from the mist nets, a number pin should be placed on the bag ties from each net. After arriving at the banding location, the birds should be processed in the order of extraction. Exceptions to this rule include the capture of large birds of species which become easily stressed such as woodpeckers and kingfishers.

**Age and sex** – the age and sex codes should be recorded using the following coding system.

0 = Unknown

1 = AHY

2 = HY

4 = L

5 = SY

6 = ASY

7 = TY

8 = ATY

0 = Unknown

4 = Male

5 = Female

For each bird, a code describing the method of aging and sexing should be recorded for all birds using the following codes.

1 = Plumage

2 = Skull

3 = Eye Color

4 = Wing Length

5 = Cloacal Protuberance

6 = Brood Patch

7 = Mouth/bill

8 = Culmen Length

9 = Retrice Shape

Wing – the un-flattened wing length (wing chord) should be recorded in millimeters.

Weight – the weight may be recorded in grams using a digital scale with 0.1 g increments.

Fat Score – the 7 point fat scoring system should be used with the following codes

0 = None

1 = Trace

2 = Light

3 = Half

4 = Filled

5 = Bulging

6 = Greatly Bulging

7 = Excessively Bulging

Cloacal Protuberance – should a bird have a CP, the relative size of the CP should be ranked using the following criteria.

0 = None (cloaca not enlarged)

1 = Small (cloaca somewhat enlarged and noticeably swollen, shape is such that it is widest at the base and narrowest at the tip. Care should be used with this ranking as it can be difficult to ascertain.

2 = Medium (cloaca protuberance large, diameter fully as large near the tip as at the base).

3 = Large (cloaca protuberance very large with a diameter considerably larger in the middle than at the base.

Brood Patch – similar to a CP, all brood patches should be ranked using the following codes

0 = None (no brood patch)

1 = Smooth (lower breast feathers and abdomen feathers lost, some vascularization present but overall, the area is rather smooth and dark red).

2 = Vascularized (vascularization evident, some wrinkles present and some fluid under the skin giving the area a pale, opaque, pinkish color).

3 = Heavy (vascularization extreme, thickly wrinkled and much fluid under the skin. This is the maximum extent of the brood patch and is present when the bird is incubating eggs).

4 = Wrinkled (vascularization mostly has disappeared and the fluid under the skin mostly gone. The skin retains many thin, dry looking wrinkles).

5 = Molting (vascularization and fluid buildup gone, new pin feathers present).

Moult – this space is reserved for recording basic information regarding a bird’s moult using the following codes. Note that this information is supplementary and should only be recorded when time and/or bird volume allows.

B = Body  
H = Head  
T = Tail  
W = Wing

GC = Greater Coverts  
MC = Median Coverts  
LC = Lesser Coverts  
A = Alula

A ranking of juvenal plumage may also be recorded in the moult section using the following codes.

3 = Full (full juvenal plumage)  
2 = Greater (more than half of juvenal plumage remains, mostly appears like a juvenile)  
1 = Less (less than half of juvenal plumage remains)  
0.5 = no juvenal plumage remaining, but formative feathers still growing in  
0 = None (no juvenal plumage)

Status- the status of each bird shall be recorded using the following codes (only some of the more common codes shown). Should consecutive birds have the same status, a line should be drawn through the status box.

300 = normal wild bird, federal numbered leg band only  
301 = normal wild bird, colored leg band  
500 = sick, exhausted, injured, crippled or deformed with federal numbered leg band  
501 = sick, exhausted, injured, crippled or deformed with colored leg band

Date – the month and day should be recorded at the top of each banding sheet and then a line should be drawn through the date boxes for each corresponding banding record.

Time – the time should be recorded as the time each respective net round was started. On each banding sheet, the first time of each net round should be recorded with a line being recorded in the time box for each bird from the net round.

Intl – the bander’s initials should be recorded for each bird banded. Be sure that the initials match the bander’s name and initials at the top of the page. Do not rewrite the bander’s initials, rather use a line in the corresponding field, except for the first bird of each day.

Trap – record the method of capture for each bird, this should typically be MN (Mist Net). Do not rewrite the trap, rather use a line in the corresponding field, except for the first bird of each day.

Tail & PP – these measurements may be recorded in special circumstances when such data may be valuable. These fields are particularly useful in terms of the *Empidonax* flycatchers.

NSB – include a checkmark in this box for all birds banded outside of the daily count period (non standard banding).

Comments – include any additional information of interest in this field.

### **2.3 Recapture Sheet**

The methods for data collection on the recapture sheet are similar to the original recapture sheet with the following exceptions.

- Take extreme care to accurately record the full band number for all birds, especially those which are not repeats from the current season.
  - In the case of repeats, a line may be drawn beneath the portion of the previous band number with the same digits.
- The age, sex and wing length are supplemental data on the recapture sheet.

### **2.4 Molt Sheet**

As with the recapture sheet, take care to record the band number accurately for all birds which are molt scored. To assign molt scores for each feather, use the codes in the attached diagram which uses a scoring system of 0 (old feather) to 5 (complete new feather). Also note that the scores of the primary and secondary feathers are the priority scores.



**Appendix 3**  
**BANDING SHEETS**

Location \_\_\_\_\_

BAND SIZE

Page # of this band size

Permit #

10791

Banders

Initials

\_\_\_\_\_

First # on this sheet

Year

Checked By

\_\_\_\_\_

**TESLIN LAKE BIRD  
OBSERVATORY -  
Original Banding  
Sheet**

#	Species	Net	Age/	Sex/	Wing	Weight	Fat	CP	BP	Wear	Moult	Status	Date		Time	Intl	Trap	Loc	Tail	PP	Bill	Comments
			How	How									Month	Day								

Last # on this sheet

Species

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Location \_\_\_\_\_

# RECAPTURES

Page # of Recaptures

Permit # 10791

Banders \_\_\_\_\_  
\_\_\_\_\_

Initials \_\_\_\_\_  
\_\_\_\_\_

**TESLIN LAKE  
BIRD  
OBSERVATORY -  
Recapture Sheet**

Year         Checked By \_\_\_\_\_

Band Number	Species	Net	Age/	Sex/	Wing	Weight	Fat	CP	BP	Wear	Moult	Status	Date		Time	Intl	Trap	Loc	Tail	PP	Bill	Comments
			How	How									Month	Day								

Species

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Location \_\_\_\_\_

# MOLT SCORES

Page #  
of Molt  
Sheets

Permit #

10799

Banders \_\_\_\_\_  
\_\_\_\_\_

Intl. \_\_\_\_\_  
\_\_\_\_\_

Banders \_\_\_\_\_  
\_\_\_\_\_

Intl. \_\_\_\_\_  
\_\_\_\_\_

TESLIN LAKE BIRD  
OBSERVATORY -  
Molt Sheet

Year

Checked By \_\_\_\_\_

Band Number	Species	Age	Sex	Month	Day	Tertials			Secondaries					Primaries										Tail	Covs	Body	Comments	
						3	2	1	6	5	4	3	2	1	1	2	3	4	5	6	7	8	9					10

Species \_\_\_\_\_  
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Appendix 4**  
**DAILY LOG SHEETS**

# TESLIN LAKE BIRD OBSERVATORY

## Daily Log Sheet

DATE	
------	--

DAILY COVERAGE CODE	
---------------------	--

Personnel	Initials	Code	Time	Hours Onsite	
				Standard	Non-Standard
BIC-					

Visitors	Origin	Time

Weather	Count Period				Synopsis
	Start	Mid	End	Dusk	
Wind Direction					
Wind Strength					
Visibility (km)					
Cloud (%)					
Temperature (°C)					
Precipitation					

Daily Count Timing					
Designated Start	Delayed Start Due To ?	Actual Start	Nets Open	Nets Close	End

Total Birds Banded	
Total Species Banded	
Total Birds Recaptured	

Total Species Detected	
SEASON BANDED TOTAL	











Species	STANDARD COUNT PERIOD						NON STANDARD COUNT					TOTAL
	Band	Recap	VIS	Obs.	Oth VIS	ET	Band +	Recap +	Vis +	Obs +	Oth Vis +	DST
Greater White-fronted Goose												
Canada Goose												
Trumpeter Swan												
Tundra Swan												
American Wigeon												
Mallard												
Northern Shoveler												
Northern Pintail												
Greater Scaup												
Lesser Scaup												
Surf Scoter												
White-winged Scoter												
Common Goldeneye												
Common Merganser												
Red-breasted Merganser												
Ruffed Grouse												
Spruce Grouse												
Red-throated Loon												
Pacific Loon												
Common Loon												
Horned Grebe												
Red-necked Grebe												
Osprey												
Golden Eagle												
Northern Harrier												
Sharp-shinned Hawk												
Northern Goshawk												
Bald Eagle												
Red-tailed Hawk												
Rough-legged Hawk												
Sandhill Crane												
Semipalmated Plover												
Spotted Sandpiper												
Solitary Sandpiper												
Least Sandpiper												
Semipalmated Sandpiper												
Parasitic Jaeger												
Bonaparte's Gull												
Mew Gull												
Herring Gull												
Thayer's Gull												
Glaucous Gull												
Arctic Tern												
Belted Kingfisher												
Downy Woodpecker												
Hairy Woodpecker												
American Three-toed Woodpecker												
Black-backed Woodpecker												
Northern Flicker												
American Kestrel												
Merlin												
Peregrine Falcon												
Olive-sided Flycatcher												
Western Wood-Pewee												
Yellow-bellied Flycatcher												
Alder Flycatcher												
Least Flycatcher												
Hammond's Flycatcher												
Dusky Flycatcher												
Say's Phoebe												
Northern Shrike												
Warbling Vireo												
<b>SUB-TOTAL</b>												

<b>Date</b>	
-------------	--

