Tree Swallow Manual

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--- SPRING 2012 ---

*Long Point is the largest freshwater sandpit in the world jutting nearly 40 km into the middle of Lake Erie. It is home to a plethora of flora and fauna such as hognose snakes, soft-shell turtles, Fowlers toad, Cucumber magnolia trees and butterfly milkweed. Additionally, hundreds of thousands of birds migrate through Long Point every spring and autumn and more than 80 bird species nest on the point.*

*Long Point holds many designations: A UNESCO World Biosphere Reserve, an RAMSAR Wetland of International Significance, A Globally Important Bird Area, an International Monarch Butterfly Reserve. During your stay, take advantage of the opportunity to get to know this glorious natural treasure.*

**Required Reading:**

* LPBO Fact Sheet for Volunteers
* Introduction to Pyle
* North American Bander’s Study Guide and Passerine Manual
* Tree Swallow Summary in BNA

**Recommended Reading:**

* LPBO Migration Monitoring Protocol

All TRES cooperators are required to abide by the rules and guidelines set forth by LPBO and outline in the Fact Sheet for Volunteers. Any questions should be relayed to the TRES coordinator or the LPBO Program Coordinator.

During your stay at LPBO, you are not required, but strongly encouraged to engage in the other program activities at LPBO (e.g. Migration Monitoring Program, Breeding Bird Census), but obviously TRES work takes priority. LPBO is one of the greatest places to gain real-world hands on experience in field ornithology, so take advantage of it. Receiving training from LPBO staff, through the migration-monitoring program, will be incredibly beneficial to the work you’ll be doing with the TRES project. TRES project and other LPBO staff and volunteers work and live hand in hand so the more time you spend getting to know one another, the more positive and productive experience you will have in the end.

## INTRODUCTION

The Tree Swallow (*Tachycineta bicolor*) is one of the most familiar and most common birds in eastern North America. While it normally nests in tree cavities excavated by other species like woodpeckers, it also readily accepts nest boxes. Along with its abundance, this feature makes the Tree Swallow a favourite species for biologists to study on its breeding grounds.

Through Bird Studies Canada, Long Point Bird Observatory monitors three nest box "colonies" of Tree Swallows at Long Point, two on the "mainland" near Port Rowan (at the Port Rowan sewage lagoons and adjacent to agricultural land at mudd creek) and the third at the tip of the Point.

May through June, volunteer research assistants check nest box contents daily, weigh eggs and young, and band the adults and the young. The amount of food available to the swallows at each site is measured every day with specially designed suspended nets that sample the abundance of flying insects. Twice-daily weather records are also collected at each site.

The objectives of this project are (1) to provide a long-term record of breeding performance of Tree Swallows in relation to their food supply and climate, (2) to provide other opportunities for research on breeding swallows, and (3) to provide training in field ornithology for students and other volunteers.

The Long Point Tree Swallow project has a superb set of data relating food abundance and weather conditions to breeding performance at 3 sites, extending over a 34-year period. This provides a sound basis for research on a variety of topics.

**Colony sites and background:**

There are three currently active colony sites:

1. Long Point
2. Sewage Lagoon
3. Mud Creek

**The Point**

This colony was established in its present location in 1969. The nest boxes are located about 1 km west of the Tip of the point and are arranged 24.4m apart in a grid of numbered (north-south) rows and lettered (east-west) columns. Each box is designated by its position, so box 10G is in row 10 and column G. At the present time the rows in use are 1-19 and the letters are D-K, but many positions are unfilled and there are a total of 64 boxes.



**Sewage Lagoon**

This colony was first established in 1977 and has since been expanded to a total of 77 boxes. The boxes are in two rows around the lagoon embankment, as well as across the street in a small cluster of 5 boxes.

**Mud Creek**

Established in 1987, the Mud Creek site is located 3.25 km north-northeast of Sewage Lagoon and contains 80 nest boxes. The habitat is an open, uncultivated field adjacent to a small woodlot.

## **TREE SWALLOW FIELD OPERATIONS**

### **Weather records:**

Equipment needed:

* Handheld wind anemometer
* Weather notebook
* Pencil
* Wrist or pocket watch

Local weather parameters are collected daily for each site in the morning and evening, **rain or shine**.

Locations of weather stations are as follows:

Sewage Lagoon — Approximately 10 meters north east of insect net S1 on right   
 side of the embankment.

Mudd Creek— Approximately 10 meters east of insect sampling net M1

Long Point— The thermometer is placed on the north facing wall of the Tree   
 swallow cabin, under a screen, ~ 50 meters from the southeast   
 corner of the grid. The rain gauge is placed along the path from the   
 tree swallow cabin to the nest box grid, ~ 20 meters from the   
 southeast corner.

The target observations times as well as acceptable range of times are as follows:

**Morning:**  0620 EST (0520 to 0720 EST)

**Evening:** 1920 EST (1720 to 2020 EST)

* Observations should be made outside of these period only if it is impossible to adhere to the specified times.

1. **Temperature**

Read temperature in °C to the nearest 0.5°C. Take **FOUR** readings in the following sequence:

Minimum (bottom of left **BLUE** arm indicator)

Current (top of mercury, left arm)

Current (top of mercury, right arm)

Maximum (bottom of right **BLUE** arm indicator)

* Check your readings, than **reset** the maximum and minimum indicators (with the magnet). Note that “current” readings often differ by as much as 1°C on the left and right arms. Record what you see.

1. **Rainfall**

* Record the amount of water in the rainfall gauge in millimeters. If there is any water in the gauge, remove the gauge, empty it and replace it. Careful to connect rain gauge on the twonails provided.

1. **Wind speed**

* To record the wind speeds use the yellow hand-held anemometer. Record wind speed in mph. Hold the hand held anemometer at arms length just above eye level in the direction to the wind for approximately 10 seconds. Average the recordings of wind speed in mph to the nearest 0.5mph and record in the daily log. Please take time to read the instructions and test the anemometer before going out to the field.

1. **Wind direction**

* To determine wind direction, use the flagging tape that is connected at the top of the pole due north of the weather stations. To become more comfortable with cardinal directions at each station, it is best to use a compass the first few times.

1. **Cloud cover**

* Record cloud cover in tenths of sky covered (x/10). Divide the sky into halves, and assess each half separately out of 5 for a total cloud cover of 10. (example: north half 2/5 + south half 4/5 = 6/10).

### **Insect Sampling:**

Insect sampling nets are operated daily from about 1 May to about 1 July as follows:

Sewage Lagoon – 2 nets; S1 and S2. Both nets are on the centre causeway; S1 at the   
 northeast end on the southeast side; S2 at the southwest end (near   
 the gate) on the northwest side of the causeway.

Mud Creek – 3 nets; M1, M2, M3. M1 is located at the weather station in the centre of   
 the field; M2 is ~ 50 meter east of M1; M3 is ~50 meters due north   
 of M1.

Long Point – 2 nets; P1 and P2. P1 is located near boxes 4G and 5G. P2 is in the   
 pond northwest of 11E.

1. **Sampling times**

* The general rule is that nets should be in operation as long as possible each day starting after 0520 and ending before 2120 EDST. The target times for insect sampling are consistent with the target times of weather collection.
* **These ranges must be at least 10 hours**, e.g. 0730-1730, but a longer range is preferable. Operating times should be shortened below these limits only if it is impossible to adhere to the specified times.

1. **Preparing the bottles**

* Fill the bottles about 2/3 full with 70% ethyl alcohol. If alcohol is in short supply, a portion of the previous day’s alcohol may be reused, but at least half of the alcohol used each day should be fresh (because old alcohol tends to become more dilute). Please confirm with the lead coordinator before using day-old alcohol.

Screw on the caps. Caps should be clearly labeled with the net numbers.

1. **Installing bottles on nets**

Equipment needed:

* Prepared insect bottles (see above)
* Weather notebook
* Pencil
* Wrist or pocket watch

* Check that the opening to inner compartment is clear of “fluff”. If not, clear it with stick provided.
* Remove any insects that are in the interior compartment of the net.
* Check that the net pole is vertical and that the guide wires are secure.
* Take the cap off the appropriately labeled bottle and carefully slide the bottle into the netting sleeve. Screw it into the thread in the top of the sleeve, then unscrew it ¼ turn. It can be difficult unscrewing the bottle after being in the sun for 10 hours and could cause damage to the insect sampling net.
* **Record** the time that the bottle was installed (to the nearest 5 minutes is adequate).

1. **Removing bottles**

Equipment needed:

* Bottle caps
* Weather notebook
* Pencil

* Any insects that are in the interior compartment of the net must first be induced to enter the bottle. This can be done by lightly tapping the net, which results in most of the insects entering the bottle within a few minutes. Remove the bottle and screw on the appropriately labeled cap.
* **Record** the time that the bottle was removed (nearest 5 minutes).

1. **Saving insects**

Equipment:

* Funnel with insect screening
* 70% alcohol
* Tweezers
* Vials
* Paper with date and insect net number written out in pencil
* Scissors
* Insects should be saved in small vials immediately after collection, so that bottles can be prepared for reuse on the following day. It is ideal to sort and identify insects the immediate day collected, however they can be done on a later date.
* Insert date and net # labels into vials.
* Strain the insects in each bottle over a funnel covered with insect screening. Make sure that all insects are removed from the bottle either by flushing them out or picking them out with forceps. Pick up insects with forceps (be careful not to crush them) and place them into the correctly labeled vial. Make sure that the alcohol covers the insects. Cap the vial and store it upright.

**If you arrive to the field, and realize that the insect bottles have been prepared improperly (ie. no alcohol in bottles, too little alcohol in bottles, etc) you will have to return to the field station to properly prepare insect bottles. Record the correct time insect bottles are installed.**

### **Nest Box Checks**

Equipment:

* Field book prepared for the field visit (ie. date labeled and nest box numbers written out)
* Pencil
* Black fine-tipped felt marker (for eggs)
* Blue broad-tipped felt marker (for young)
* 50.0g scale in a protective case (ie. Folgers bucket)
* Millimeter ruler for large young
* Small containers or cups for weighing eggs or young

Nest box checks are scheduled to record important events in the nesting cycle. The normal frequency of checking at various stages is summarized below, but this should be regarded as indicating the minimum amount of checking needed if the nest is progressing in a normal way. If in doubt, additional checks should done.

**Preparation should always be done before going into the field. Certain questions you should ask yourself BEFORE leaving the field station for the day are:**

1. *Do I have everything I need to complete my task(s) today?*
2. *Is everything working? (test markers, pencils, scales, etc).*
3. *Is my field notebook filled out properly for fast and efficient data entry while at a nest box?*
4. *Do I completely understand my task(s) today?*

Because nest box checks are scheduled to record important events in the nesting cycle, it is imperative to plan your day around weather to record said data. Keep track of weather on intellicast radar to schedule nest box visits accordingly. **DO NOT check nest boxes in the rain**. **AVOID field work when thunderstorms are imminent.** If you are checking nest boxes and it starts to rain, use your discretion on whether to continue based on:

1. *How many nest boxes you have left to check*
2. *How hard the rain coming down*
3. *How cold is it outside*
4. *Do not go out or stay out in thunderstorms.*

Any questions or concerns should be raised to the leader of the Tree Swallow team.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Stage** | **Check Frequency** | **Task(s)** |
| **1.** | Before 10 May or until first egg is found | Every 2 days | Record contents |
| **2.** | Egg-laying to 3 days after clutch complete | Every day | Mark and weigh new egg(s) |
| **3.** | 4-11 days after clutch complete (ie. 6 & 9 days after clutch complete) | Every 3 days | Record contents |
| **4.** | 12 days after clutch complete to hatch complete | 2 times per day | Mark and weigh new young; record eggs present |
| **5.** | Mean age of brood 3, 6, 9 days | At each age | Remark young |
| **6.** | Mean age of brood 12 days | — | Band, weigh, measure outer primary |
| **7.** | Mean age of brood 15 days | — | Measure outer primary |
| **9.** | Mean age > 15 days | Every day until gone | Record number of young. Do not handle. |

1. **Eggs**

Eggs should be marked with indelible black marks (with a soft fine-tipped marker) in the sequence in which they are laid, if known. Mark eggs on both the top and bottom. Tree Swallows commonly rotate eggs during incubation and having both ends of the egg marks aids in quick detection of new eggs. Use the following marks:

1st egg **.** 5th egg **: ⋅ :**

2nd egg **. .** 6th egg **: : :**

3rd egg **∴** 7th egg **: ⋅ : :**

4th egg **: :** etc.

* Eggs are usually laid in the early morning (c. 0700 EDST). Checking after 0900 usually records all eggs laid on that day. If two or more new eggs are present, attempt to determine their laying sequence from the diameter of the air space at the large end of the egg. Older eggs have **larger air spaces**. (The air space is visible through the shell of the egg.) Newly laid eggs have no air space.
* Weigh the egg on the day it is laid or the day on which it is first seen. An insect cap is used with a foam and tissue paper insert to protect the egg. Weigh on a scale in a protective case to 0.01g.

1. **Egg checks during incubation**
2. Check the boxes on 3 successive days after the last egg is laid, then every 3 days from day 3-12. Depredation is possible, and therefore important to record any missing eggs.
3. If the clutch appears to be complete at 4 or fewer egg, keep checking every day for five days, unless the adult is in the box (incubating) each time you visit it on the first three days. These nests may represent cases of birds skipping laying, especially if they contain four or fewer eggs.
4. At the nine and 12 day checks, record eggs as (i) pink or clear (translucent) or (ii) opaque (ie. chalky white). Opaque eggs are usually fertile. Pink or clear eggs are infertile.
5. **Hatching**

It is important to determine hatching times as accurately as possible. This is done by visiting nests frequently during the hatching period and recording the weight and condition of the young when first seen.

1. Hatching checks are done (i) immediately after putting up the insect bottles in the morning and (ii) with regular check, immediately before removing insect bottles in the evening.
2. Starting at the mid-day check 12 days after clutch completion, check for hatch 3 times per day at Tip, 2 times per day at MC and SL. For clutches of 7+, start at the morning check on day 12.
3. An additional check of boxes with pipped eggs or hatching in progress may be done at or near mid-day when convenient (eg. At completion of a trapping session).
4. For each check, prepare a list of boxes to be checked in advance.

1. Observe number of eggs present and their I.D. numbers. Depredation is possible, and therefore important to record any missing eggs.

2. Record eggshells present, if any, and their I.D. numbers, if visible; and the young hatched from this egg if definitely known.

1. **Record number of young present and their I.D.s (see below)**
2. For newly hatched young -- Mark (see below) and weigh with a scale in a protective case (as for eggs). Record its condition as follows:

0 = just hatched, shell still present  
 1 = wet, down matted  
 2 = partly dry, down partly fluffy  
 3 = dry, down all or nearly all fluffy

1. Marking young -- Mark the young with blue magic marker on one or more appendages according to the scheme indicated below. If blue is not available, use green or black; avoid red. Marks should be on the inside of the legs and/or underside of wings.
2. Marking scheme –mark in the following sequence according to age or weight whenever possible (it does not matter if a different sequence estimated is used, but it is easier to keep track of nestlings if you use this same sequence in all nests):

|  |  |  |
| --- | --- | --- |
|  | **ID** | **Appendages Marked** |
| 1st hatched | LL | Left leg |
| 2nd hatched | RL | Right leg |
| 3rd hatched | LW | Left wing |
| 4th hatched | RW | Right wing |
| 5th hatched | LLRL | Left leg and right leg |
| 6th hatched | LWRW | Left wing and right wing |
| 7th hatched | LLLW | Left leg and left wing |
| 8th hatched | RLRW | Right leg and right wing |

(Note that LLRW and RLLW do not occur in the above 8 codes. All double markings above are of adjacent appendages, not diagonal ones.

1. When new young are marked, make sure that the marks of older young are clearly visible and remark them if necessary.

### **Determining the mean hatch time of the brood to the nearest day:**

The objective is to determine the date on which the mean hatch time occurs (ie. between 0000hrs and 2400hrs local standard time).

Sometimes this will be obvious, but if it is not, use the following procedure.

Assign to each young an estimated hatch time to the nearest 0.25 day as follows. For example:

|  |  |
| --- | --- |
| **Young estimated hatched in this 6hr time period** (times are EDST) | **Estimated hatch time (to nearest 0.25 day)** |
| 2220 9 June – 0420 10 June | 10.0 |
| 0420 – 1020 10 June | 10.25 |
| 1020 – 1620 10 June | 10.5 |
| 1620 – 1220 10 June | 10.75 |
| 2220 10 June – 0420 11 June | 11.0 |

If the estimated hatch times for the brood are:

LL 10.25

RL 10.25

LW 10.5

RW 10.5

LLRL 10.75

LWRW 11.5

Then the mean hatch is the (total ÷ 6) = (63.75 ÷ 6) = 10.625, and the mean hatch date is 10 June.

If the mean hatch is any number ≥ 10 and < 11 (10.000 to 10.999), then the mean hatch date is 10 June.

Estimates of hatch time will be based mainly on times of observation of eggs and newly-hatched young, but it will also be necessary to take into account the weight and condition of the young when it is first seen. If an eggshell is present, assume that the smallest young has just hatched (shells are normally removed by the female almost immediately after hatch).

Use the following table to estimate ages from weights:

|  |  |
| --- | --- |
| **Weight (g)** | **Age (hrs)** |
| ≤ 1.3 | 0 |
| 1.4 | 2 |
| 1.5 | 5 |
| 1.6 | 8 |
| 1.7 | 11 |
| 1.8 | 14 |
| 1.9 | 17 |
| 2.0 | 19 |
| 2.1 | 21 |
| 2.2 | 24 |
| 2.3 | 26 |
| 2.4 | 28 |
| 2.5 | 30 |
| 2.6 | 32 |
| 2.7 | 33 |
| 2.8 | 35 |
| 2.9 | 37 |
| 3.0 | 38 |

The above table is based on average values for known age young. As young vary in size at hatch and growth rate, there will be some error in these age estimates. Therefore estimates will sometimes not agree with known facts, in which case the **known facts** should take precedence in determining age.

1. Calculate dates on which the brood is 3, 6, 9, 12 and 15 days of age by adding these numbers to the mean hatch date.
2. Check the nests and remark the young at 3, 6, and 9 days of age. Marks wear off young that are not remarked at least this often.
3. **12-day checks**

Weights and measurements should be taken after 1720. Young may be banded at any time (often in the morning if many).

Record data on growth sheets. At 12 days:

1. Band the young and note the band number alongside the I.D. mark (which should not be renewed).
2. Weigh the young.
3. Measure the length of the outer primary of the young from the point where the sheath enters the skin to the tip
4. **16-day checks**
   * + 1. Record data on growth sheets. Measure outer primary of young. Care must be taken to avoid premature flight of young.

### **TRAPPING ADULTS**

Equipment needed:

Banding kits should be prepared separately for each site to aid in data entry at a later date. Each banding kit should include:

* Banding pliers
* Note books to record trap times
* Pencils
* Bird bags numbered
  + Sewage Lagoon numbered 1-20
  + Mud Creek numbered 21-40
  + Long Point Numbered 1-15
* U.S. Fish and Wildlife Aluminum bands in a camera film container
  + If there are <25 bands on a string, bring another envelope of bands into the field the following day
* Traps
  + Tape on traps should be replaced the beginning of every season and as needed throughout the season
* Scale + envelopes to hold birds
* Wing ruler
* Forms with target nest boxes filled out
* Black pens for filling out forms
* Tarp
* A box to carry all supplies in

Adults are to be trapped sometime between the time the first young hatch and when they are 12 das old. It is **high priority** that all adults be trapped but it does not matter when this is done, provided it is done before the young are 12 days old. It is preferable, however, to do as much trapping as possible soon after hatch, so that more attention can be given to “difficult” birds later.

Any adult found in a box with young should be removed and examined, unless known to have been previously caught. Males and females can be trapped with drop traps while feeding young.

Weigh and measure wing chord of each adult trapped. Band it (B) or record its band number if it is a Retrap (R). Record the band number as “B 0880-37920” or “R 0880-37920”, respectively. Record whether the bird has a brood patch (BP) or cloacal protuberance (CP). Record whether its plumage color is Blue (BLU), Brown (BRN), or Intermediate (INT).

Plumage categories and age/sex designations are summarized below. For more details see the appended key and discussion.

BLU birds (ASY) – More than 90% of the upper parts iridescent blue-green.

INT birds (AHY) – More than 50% up to 90% of upper parts iridescent blue-green (remainder dull brown or brown tinged with green).

BRN birds (SY) – Up to 50% of upper parts iridescent blue-green (remainder > 50% dull brown or brown tinged with green).

Age/Sex: Basically there are 4 age-sex categories as indicated below. Refinements may be found in the full key. Usually we do not check skull ossification (pneumatization) and this is likely to be worthwhile only for unbanded males (CP) and Intermediate females.

BLU with CP = AHY M

BLU with BP = ASY F

BRN with BP = SY F

INT with BP = AHY F

Note that BRN and INT do not occur with CP.

**Before trapping:**

1. Count the number of traps in your kit

**When birds are trapped:**

1. Note the box number and the bag number in a notebook, then transfer this information to the “target nest box” sheet.
2. All birds awaiting processing must be stored in the banding box, placed so the bird bags are always shaded.
3. Females take precedence over males for processing and release; but processed females may be kept for up to 1 hour until male is trapped. Releasable females and males take precedence for processing over females that must be kept.

**At the end of a trapping day:**

1. Bird bags should be flipped inside out
2. All instruments should be wipped down with a disinfecting wipe
3. Tape should be checked on traps
4. Count the number of traps to be sure you have them all
5. Forms should be written out onto standard banding sheets
6. Retraps should be filled out onto retrap cards
7. The banding box should be prepped for the next day

**CODES**

RAIN: T = trace

INSECTS: S1 = Sewage Lagoon #1

S2 = Sewage Lagoon #2

Label ex. S2 MAY 24/1990

NEST: MT = empty

1/8, ¼, ½, ¾, C

CC = complete cup

PC = partial cup

FF = few feathers

SF = some feathers

MF = many feathers

VMF = very many feathers

EGG NO’S: 1 = **⋅**

2 = **⋅ ⋅**

3 = **∴**  Age by air space

4 = **: :**  older = larger air space

5 = **: ⋅ :**

6 = **: : :**

7 = **: ⋅ : :**