Pilot Migration Monitoring at Tommy Thompson Park:
Spring and Fall 2003

(Seabrooke Leckie 2003)

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Table of Contents

Section		Page
	Executive Summary……	1
1	**Introduction**……	2
	Study Site……	2
	Project Partners……	2
	Methods……	3
2	**Spring Results**……	4
	Spring Synopsis (Weekly)……	4
	Spring Analysis……	6
	Banding……	6
	Recaptures……	7
	Species Coverage……	8
	Personnel……	8
	Discussion……	8
3	**Fall Results**……	9
	Fall Synopsis (Monthly)……	9
	Fall Analysis……	13
	Banding……	13
	Recaptures……	14
	Captured-Unbanded……	15
	Species Coverage……	16
	Net Analysis……	17
	Personnel……	18
4	**Spring and Fall Discussion**……	18
	Historical Perspective……	19
5	**Saw-whet Owl Monitoring**……	20
6	**Education**……	22
7	**Recommendations**……	22
	Acknowledgements……	25
	References……	26

List of Tables

1	Weekly Analysis, Spring……..	6
2	Top Ten Species Banded, Spring……..	7
3	Recaptures, Spring……	7
4	Spring Species Coverage Summary …….	8
5	Volunteer Effort, Spring……	8
6	Banding Totals for TTP and LPBO, Aug-Sept 20th, 2003)……..	10
7	Banding Totals-October 6, 2003…….	11
8	Monthly Capture Statistics, Fall……..	13
9	Top Ten Species Banded, Fall 2003……..	13
10	LPBO Top Ten Species Banded, Fall 2003……..	13
11	Recaptures, Fall…….	15
12	Captured-Unbanded……	15
13	Fall Species Coverage Summary……..	16
14	Net Analysis, Fall……..	17
15	Volunteer Effort, Fall…….	18
16	Spring and Fall Comparison……	19
17	Comparison of TTP and Mugg's Island Banding Totals……..	19
18	Top Ten Species Banded During Spring, Mugg's Island and TTP……	20
19	Top Ten Species Banded During Fall, Mugg's Island and TTP……	20
20	Summary of Owl Recaptures……..	21
21	Owl Monitoring Capture Statistics……..	21

Appendices

A	Spring Banding Totals, 2003……	28
B	Spring Species List, 2003……	29
C	Priority Species for Spring Monitoring at TTP……..	30
D	Fall Banding Totals, 2003……	31
E	Priority Species for Fall Monitoring at TTP……	32
F	Capture Totals, Spring and Fall 2003……..	33
G	Monthly Fat Scores, Fall 2003……	35
H	Monthly Totals, Spring and Fall, 2003……	36
I	Daily Totals, Fall 2003……..	38
J	Banding Totals, Mugg's I. And TTP……	40
K	Summary of Fall Records by Species……	43

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EXECUTIVE SUMMARY

In April of 2003, Toronto and Region Conservation Authority (TRCA) and Toronto Bird Observatory (TBO) established a partnership to steer and develop a pilot migration monitoring station at Tommy Thompson Park (TTP). The objective of this endeavour was to accurately assess the significance of the park for migrating birds through research and also to increase awareness of migrant ecology and conservation through education.

Spring migration monitoring was conducted from May 3rd-June 8th. The May 3rd start date was late. In the future, spring fieldwork will start on April 1st to maximize coverage. In addition to many partial gaps in netting coverage, 7 days were entirely lost to weather and or lack of personnel. Coverage in spring 2003 was only 29% of the spring target in years to come. In total 870 birds of 66 species were banded from 30 days of coverage. The captures per net hour rate was .51. 163 birds were recaptured for the spring season, which includes a foreign recovery of a Common Grackle. Overall, spring species coverage was low, however this is attributable to low net hours and the lack of a census. Thirty-one volunteers contributed 727 total person hours to the spring fieldwork.

Fall migration was conducted on 84 of 91 target days (92%). Seven days of 91 target days were lost to weather. 3,327 birds were banded from standard net hours (falling within daily 6 hour boundaries). 5 birds were banded from supplementary net hours. 6, 726 net hours were logged (88% completed for attempted dates). The birds banded/net hour rate was .49 for the fall season. October was easily the busiest period of the fall season, both for new bands and recaptures. Two foreign recoveries were encountered, a Hermit Thrush and a Sharp-shinned Hawk. The ratio of Hatch-years (HY) to After-hatch years (adult) was 5/1 or 82% HY. Fall species coverage was very good but can still be improved with adjustments to methods and timing. Twenty-four volunteers contributed 1285 hours to the fall project.

Analysis of fat deposit scores revealed a positive correlation between fat levels and increased abundances for several species in October 2003. This suggests that October migrants have distinctive stopover needs with respect to greenspace in the Greater Toronto Area (GTA).

Historical Toronto Bird Observatory data from Mugg's Island migration monitoring provided a broader view of landbird migration on Toronto's waterfront. Analysis here is limited by variation in coverage between sites. Overall, species composition is consistent with some exceptions.

A pilot Saw-whet Owl Monitoring Project was initiated in October 2003. Owl banding was conducted on 18 evenings from October 20th-November 20th. 179 Northern-Saw-whets and 1 Long-eared were banded and 4 Saw-whets were recaptured. Three of the four recaptures were foreign recoveries (originally banded elsewhere).

The pilot year at Tommy Thompson Park revealed that the site is appropriate for education. Numbers of visitors are high and will be higher in the near future when the park is open on a daily basis. Overall, the pilot year of migration monitoring was a success in light of both the ability to perform effective research and achieve educational mandate.

INTRODUCTION

Study Site

Tommy Thompson Park (TTP) is located on Toronto's waterfront, which is situated on the northwestern shore of Lake Ontario. The park (formerly Leslie Street Spit) is a man made peninsula, which extends 5 kilometers in a southwestern direction into Lake Ontario. The Toronto Harbour Commission (now known as the Toronto Port Authority (TPA) began construction of a landbase at the base of Leslie Street in the late 1950's to expand port facilities in anticipation of increased shipping activity in the Great Lakes. From the late 1950's until present day, a combination of lakefilling and dredging activities created the current configuration of TTP. TTP has a total land base of approximately 160 hectares and a water surface area of 100 hectares composed of the western embayments and the inner disposal cells.

Much of the land area of TTP has, through natural succession processes, been colonized by a variety of plant and animal communities. The geographical situation of the park and also its natural features, make it very suitable for large numbers of colonial waterbirds and migrating landbirds. Overall, the Park represents the largest area of existing natural habitat on the Toronto waterfront. Tommy Thompson Park has been designated as an Environmentally Significant Area (ESA) and was designated as an Important Bird Area (IBA) by Birdlife International in 2001.

The site selected for migration monitoring is located on peninsula D (one of many peninsulas which branch off the main spine of the spit). The habitat consists of early succession cottonwood, willow and birch. Silver Maple, alder and cedar are interspersed in low density.

Project Partners

The Toronto and Region Conservation Authority (TRCA) was formed in 1957 for the management and conservation of natural resources in the Greater Toronto Area (GTA). Since its formation Toronto and Region Conservation has prepared and delivered programs for the management of the renewable natural resources within its watersheds. Thanks to the support of all levels of government and the valuable partnerships we have established, the Authority provides:

- protection, enhancement, and regeneration of natural resources on a watershed basis
- sound environmental information and advice to promote good land management practices
- community action on environmental projects
- outdoor recreation opportunities on 13,000 hectares of open space, forest lands, and Conservation Areas
- conservation education and heritage programs through our outreach education programs, residential and day-use Outdoor Education Centres and Black Creek Pioneer Village

Objectives of TRCA and the Living City Campaign include the maintenance of healthy rivers and shorelines, regional biodiversity, sustainable communities and business excellence. Migration monitoring at Tommy Thompson Park was born out of the objectives of TRCA's Living City vision.

Toronto Bird Observatory (TBO) is a non-profit organization dedicated to bird monitoring in the Toronto region. Formed in 1978, TBO was principally active on the Toronto Islands (adjacent to TTP), where through volunteer support, migration monitoring was the main objective.

TRCA and TBO are partners in the development and management of the Tommy Thompson Park Migration Monitoring Program. The objective for the partnership is to collect quality scientific data that can be used for the monitoring of population changes in migratory landbirds, and also to foster awareness through education. The partnership is contingent upon the results of the first year pilot study summarized in this report.

Methods

Migration Monitoring Overview

The Breeding Bird Survey (BBS) is the principle method employed by conservation organizations to monitor bird populations. This method is effective only where breeding populations are accessible by roadside data collection. The remoteness of northern Canada preclude such survey methods. It is therefore necessary to monitor these populations on their south and northward movements during migration. The Canadian Migration Monitoring Network (CMMN) is a national initiative headed by Bird Studies Canada (BSC), enacted to assess changes in populations of migratory landbirds at the continental level. Migration monitoring in Canada began in the 1960's at Long Point in southern Ontario and has since spread across the country from coast to coast.

Standardization

To be an effective tool for population monitoring, data collection at migration monitoring station must be carefully considered. Adherence to set guidelines and rules are essential for the production of quality population indices. However, the initial pilot year or years at a migration monitoring station should be experimental with shifting net arrangements and approaches in order to deduce the most effective protocol. Spring, 2003 featured a basic approach (banding and casual observations) with rotating net setups. During the fall phase of the project at Tommy Thompson Park, staff employed a standard census and capture program to derive a detected total (DT) for each species. Analysis in this document is weighted towards the fall for this reason.

Census (Fall)

Census was conducted daily during the fall and consisted of a fixed route, fixed duration line transect. The census was executed by a single experienced observer who is not permitted to stray from the transect path and is not permitted to use pishing, owl calls or other means of attracting birds. Census began at 1 hour after sunrise and ran for a minimum and maximum of 60 minutes. The census does not employ distance estimation as in standard point count protocols (unlimited radius).

Banding (Spring and Fall)

The capture program was composed of a range of total nets and net locations in order to arrive at an appropriate setup for long term monitoring. Nets were operated from one

half hour before sunrise and were run (weather permitting) for six hours. Nets were brand new, avinet, 30mm mesh, 9m lengths. Nets were held in place with 1 inch diameter electrical conduit. In 2003, we tested 20 net locations but will decide before spring 2004 where nets will be permanently located.

Detected Totals (Fall)

The detected total (DT) is the figure used for trend analysis by Bird Studies Canada. The DT is an estimation of the number of individuals present on a given day per species. This estimation was based on totals derived from the census and capture surveys. The detected total varies from the estimated total (ET) used elsewhere in that it does not require more subjective estimations beyond what is actually detected. The DT cannot be a larger figure than the sum of census and capture totals whereas the ET often is due to the belief that not all individuals are sampled.

Casual Observations (Spring and Fall)

The census only comprises 60 minutes of the count period (6 hours, beginning ½ half before sunrise). Naturally, observations are made in the remaining 5 hours. This data is called casual observations and is treated as non-standard. Casual observations are not considered for the calculation of detected totals because there is considerable variation in day-to-day effort, area covered and observer skill. Casual Observations are factored into the daily species total (DST) which accounts for all of the non-standard data plus the DT.

Count Period (Spring and Fall)

The count period is the standard 6-hour period within which all standard data collection occurs. The count period begins one half hour before sunrise and continues for 6 hours.

Count Area (Fall)

The count area refers to boundaries, within which data can be recorded for the DT. Census, mist nets, and observations take place within the Count area only.

Protocol

The protocol used in 2003 was summarized above. A comprehensive protocol is described in: “Operations Manual: Tommy Thompson Park Bird Research Station”, which will be completed by spring 2004.

SPRING RESULTS

Spring Synopsis (Weekly)

May 3rd-May 9th

Spring coverage began on May 3rd with twelve mist nets in operation. Paolo Viola was the Migration Monitoring Coordinator for the spring migration monitoring. Numbers of birds in early May were low, possibly a reflection of the weather patterns which were clear and cold with unfavourable winds. However, species diversity was increasing by

the day as flycatchers, warblers and sparrows began to come through. Species detected in the highest concentration were, Palm Warbler, Myrtle Warbler, White-throated and White-crowned Sparrow and Hermit Thrush. The biggest day of the first week of spring monitoring was May 7th when 52 birds were banded comprising 16 species. Seventeen species were captured the following day of the 8th including the following new arrivals for the season: Gray Catbird, Brown Thrasher, Chestnut-sided Warbler, Magnolia Warbler, Northern Waterthrush and Lincoln's and Swamp Sparrow.

May 10th-May 16th

While diversity thus far was in keeping with the "norm", species density was still quite low. This pattern wasn't helped in the second week of coverage, as total net hours were the lowest of the spring. However, capture rates (captures/net hour) were the highest of the season. The mid-late part of May is widely considered the peak of spring migration in this region. Weather limited capture effort for the first half of the period but resumed to full operation on the 14th, which resulted in only 29 new birds in the nets. Fifty-six birds were banded on the 15th.

May 17th-23rd

An average of 29 birds were banded during the 3rd week of spring coverage. Given that this should have been the peak period, numbers were disappointing. Of interest was the observation of very few catharus thrushes for the period (e.g. Swainson's, Veery, Wood, Gray-cheeked). Several species seemed to be late. Fifty-six and 49 birds were banded on the 17th and 18th respectively. Least Flycatcher was the most numerous species banded on the 18th (5 banded) which is inconsistent with typical patterns at a migration station in mid-May. Warblers should have been present in the largest numbers.

May 24th-31st

The period of May 24th-30th was the peak for migration monitoring at TTP in spring 2003 as 287 birds were banded in the 7 day period at an average rate of 41 birds per day. Many species reached season high one-day abundance levels including; Swainson's and Grey-cheeked Thrush, American Redstart, Common Yellowthroat, and Wilson's Warbler. Eighty-five birds banded on the 29th was a season high one-day banding tally.

June 1st- 8th

Typically, the first two weeks of June feature a much weaker migration although the period is often the key window for flycatchers, vireos and Blackpoll Warblers. 106 birds were banded for this period, which had reduced banding coverage due to personnel shortage. Staff and volunteers noticed higher than normal concentrations of migrants including the thrushes, which appeared to be late this spring, at least at TTP. The last day of coverage was June 8th of what was a quiet but incomplete pilot season.

Table 1. Weekly Analysis, Spring.

Week	Banded	Net Hours	Captures/net hour
May 3-9	151	366.75	.41
May 10-16	120	159	.75
May 17-23	206	447.5	.46
May 24-31	287	488	.59
June 1-8	106	258	.41
Total	870	1719.25	.51

Spring Analysis

Banding

Analysis of data from spring migration monitoring includes only banding data. Some casual observations were noted but cannot be treated as a statistically viable data set.

Looking at the weekly breakdown of capture rates in Table 1, it is clear that captures/net hour were higher than expected when considering the overall banding total. In fact, out of a possible 3,108 net hours for the season (84 net hours/day x 37 days), only 1, 719 were completed (55%). Weather and lack of personnel led to this loss of net hours. The projected coverage period for 2004, beginning April 1st and ending June 8th, comprises a possible 5,880 net hours for 70 days of maximum coverage. Therefore, spring 2003 was only 29% of the spring target in years to come. A smaller sample such as this is adequate for a pilot season where the aim is to attain a snapshot of the migration season.

Banding totals presented in Table 2 and Appendix A, provide insight into the character of spring migration at Tommy Thompson Park in 2003. Swainson's Thrush (86 banded) was the most commonly banded species of the spring, which is highly unusual for a banding station in the Great Lakes. Banding totals for Lincoln's Sparrow (27), Least Flycatcher (36) and Gray-cheeked Thrush (29) are quite high relative to totals for several warbler species, which normally appear in the top ten for spring seasons elsewhere. Banding totals for Chestnut-sided (8), Tennessee (1), Black-and-white (4), Black-throated Green (4) and Black-throated Blue Warbler (11) are especially low considering coverage was reasonable throughout the migration window of these species. Very low totals were also recorded for Chipping (2) and Savannah Sparrow (1) as well as Red-eyed Vireo (6).

Several commonly captured species were not sampled at all by the mist nets. These species include: Blue-headed Vireo, Blue Jay, Cedar Waxwing, Blue-gray Gnatcatcher, Golden-crowned Kinglet, Winter Wren, Yellow-bellied Flycatcher, Cape May Warbler, Slate-coloured Junco, and Fox Sparrow. Either an earlier start date or the addition of a daily census in 2004 will monitor most if not all of these species.

Table 2. Top Ten Species Banded, Spring.

Rank	Species	Total Banded
1	Swainson's Thrush	86
2	Yellow Warbler	51
3	Magnolia Warbler	48
4	White-throated Sparrow	47
5	Gray Catbird	43
6	Common Yellowthroat	41
7	American Goldfinch	37
8	Least Flycatcher	36
9	Myrtle Warbler Gray-cheeked Thrush	29
10	Lincoln's Sparrow	27
	Total	474

Recaptures

There were 163 recaptures in spring, 2003. Of this total figure, 162 were repeats and 1 was a foreign recovery. There are three types of recaptures: repeat, return and foreign recovery. A repeat is a recapture of a bird banded and recaptured in the same season at the same site. A return is a recapture of a bird banded in a prior season at the same site. Lastly, a foreign recovery is a recapture of a bird banded at a different site from any season. The foreign recovery from spring 2003 was of a Common Grackle, believed to have been originally banded on Mugg's Island by Toronto Bird Observatory (further details to come). Table 3 presents a summary of recapture totals by species in order of abundance.

Table 3. Recaptures, Spring.

Species	Repeat	Foreign	Species	Repeat	Foreign
Yellow Warbler	51		Black-throated Blue Warbler	2	
Gray Catbird	17		Chestnut-sided Warbler	2	
American Goldfinch	9		Nashville Warbler	2	
Magnolia Warbler	8		Northern Cardinal	2	
Song Sparrow	8		Red-winged Blackbird	2	
Black-capped Chickadee	7		Veery	2	
Eastern White-crown. Sparrow	7		White-throated Sparrow	2	
Common Yellowthroat	6		Hermit Thrush	1	
Brown-headed Cowbird	5		Least Flycatcher	1	
Black-and-White Warbler	4		Lincoln's Sparrow	1	
Warbling Vireo	4		Myrtle Warbler	1	
American Redstart	3		Ovenbird	1	
Wilson's Warbler	3		Ruby-crowned Kinglet	1	
Western Palm Warbler	3		Swainson's Thrush	1	
American Robin	2		Common Grackle		1
Baltimore Oriole	2				
Brown Thrasher	2		Total	162	1

Foreign Recovery:

Band	Species	Age	Sex	Day	Month	Year	Area
1383-77976	Common Grackle	1	5	29	5	2003	TTP

Species Coverage

Species coverage is a significant factor in the evaluation of a pilot migration monitoring site. Bird Studies Canada uses a system that ranks each landbird species according to conservation priority. The rankings are based on the percentage of a species range that is covered by Breeding Bird Survey. Therefore, priority A species (highest priority) are species whose range is covered the least by the Breeding Bird Survey because of the remoteness of territories in northern Canada and Alaska.

Given that analysis can only include banding data from the spring, species coverage is incomplete and does not provide an accurate assessment of the significance of Tommy Thompson Park for spring migration monitoring. Subsequent spring seasons with a fully standardized monitoring regime and a broader coverage window will provide this. Table 4 lists the species covered based on banding data alone. A more complete picture of species coverage is provided in Appendix C. A species is considered covered when at least 10 (preferably 20) individuals are recorded in a season on an average of 5 dates.

Table 4. Spring Species Coverage Summary (successfully monitored).

Priority A	Priority B	Priority C	Priority D
Gray-cheeked Thrush	Myrtle Warbler	American Redstart	Eastern Phoebe
Lincoln's Sparrow	Ruby-crowned Kinglet	Common Yellowthroat	Hermit Thrush
Magnolia Warbler	Palm Warbler	Least Flycatcher	Red-winged Blackbird
Swainson's Thrush	White-throated Sparrow	Ovenbird	Song Sparrow
Wilson's Warbler	White-crowned Sparrow	Yellow Warbler	

Personnel

Thirty-one volunteers contributed 727 hours to the spring effort. Paola Viola, TRCA staff member, was the Migration Monitoring Coordinator of the spring operation. The volunteers are essential for the completion of the field program at Tommy Thompson Park Bird Research Station. An initiative has been taken to ensure that there is a skilled base of volunteers on hand to assist with the program. A summary of volunteer effort is provided below (Table 5).

Table 5. Volunteer Effort, Spring

Name	Hours	Name	Hours	Name	Hours
Mary Boswell	101	Attila Fust	18	Richard Joos	12
Lori Nicholls	71	Burt Vanderzon	18	Greg Sadowski	9
Ian Sturdee	54	John Brett	18	Merrilea Shields	9
Tove Christensen	50	Prabha Khosla	18	Cindy Pyves	6
Larissa Neuman	35	Larysa Struk	16	Jeff Nichols	6
Dan Zabelishensky	30	Roxanne Struk	16	Sean Hollis	6
Diego Garcia-Bellido	30	Leanne Pancer	14	Theresa Hollosi	5
Corina Nagy	28	Paul Prior	14	Patrick Scanlon	3
Sandra Znajda	28	Kara Lefevre	12	Sue Hayes	3
Graham Smith	27	Knud Rasmussen	12		
Dave Rayner	26	Norma Vanderzon	12		
				Total Volunteer Hours	707

Discussion

Migration monitoring began on May 3rd, which was significantly later than the norm for a migration station in Ontario. Spring coordinator Paolo Viola observed very high landbird

concentrations in the latter part of April, the highest of the entire season! This anecdotal report of heavy migration in April 2003, suggests that weather may have been more conducive to grounding migrants in early spring as opposed to later in May (Paolo Viola pers. comm.). Subsequent seasons (complete) will be instructive for the understanding of spring migration at Tommy Thompson Park. Species which peak in April include; Hermit Thrush, Northern Flicker, Golden and Ruby-crowned Kinglet, Fox Sparrow, Dark-eyed "Slate coloured" Junco and American Robin. The bulk of these species were missed in spring 2003. Spring coverage in 2004 will commence on April 1st to ensure that these species are monitored appropriately.

In total 870 birds of 66 species were banded from 30 days of coverage between May 3rd and June 8th. In addition to many partial gaps in netting coverage, 7 days were entirely lost to weather and or lack of personnel. 163 birds were recaptured for the spring season, which includes a foreign recovery of a Common Grackle. Thirty-one volunteers contributed 727 total person hours to the spring fieldwork.

The geography of Tommy Thompson Park is such that migrants reaching landfall there have several options for diurnal orientation. Peninsula D (banding site) is one such option. The tip or base of the spit may well be higher concentration points, however these locations are unsuitable for reasons of site security and access. It is reasonable to conclude that the banding station on peninsula D is accounting for a small portion of what is migrating through and stopping over at Tommy Thompson Park. This differs from most stations in Ontario that are located on the apex of prominent peninsulas (Long Point-LPBO, Thunder Cape-TCBO, Prince Edward Point-PEPBO). A larger sample size is beneficial for the generation of accurate population trends, however a smaller sample can be equally useful if data collection is consistent year to year. A more rigorous survey approach (observation and capture) planned for 2004 will greatly improve species detection.

FALL RESULTS

Fall synopsis (Monthly)

August

Fall migration monitoring began on August 13th with 16, 9-meter length mist nets and a standard census. TRCA and TBO personnel were once again anxious to discover what lay ahead for the fall period. It was immediately apparent that bird movement was light as banding totals for the first week were made up of mostly lingering breeders, juveniles and residents. Yellow Warbler is perhaps the most noticeable migrant of August. The species typically peaks in the first week August and as such we only managed to catch the tail end of their migration. The season high for Yellow Warbler was reached on August 16th (13 Detected Total). Empidonax Flycatchers also peaked during the first week of fall coverage with Traill's on the 16th (6 DT) and Yellow-bellied Flycatcher (3 DT) on the 18th.

Weather in August was hot and dry with little or no wind. As a result, there was no significant migration recorded on the ground during the period. The 37 birds banded on the 23rd of August represented the highest one-day banding total for August. Of the 37 banded, 18 were warblers (12 species) including the only Blackburnian Warbler banded for the fall. Therefore, diversity was good but numbers were still very low. TTP bird

research station staff and volunteers were not concerned, as September is the month when high concentrations of migrant warblers occur. A single Blue-winged Warbler was observed on the morning of August 29th.

In retrospect, August fell neatly into the norm as weather was hot and clear and bird numbers were low. 293 birds were banded at an average rate of 16 birds/day. Fifty-nine birds were recaptured. From 20 monitoring days, 17 days were covered with census and/or banding. 1433 net hours were logged. Captures/net hour for August was .20.

September

September is a critical period for fall migration, as numbers and diversity are the highest at that time for neo-tropical migrants. Weather for September was hot and dry with high-pressure systems dominating. This weather pattern tends to reduce observation and banding totals of nocturnal migrants

Season high detected totals were established for several species in the first two days of September, including: Veery (4), Cedar Waxwing (55), Blackburnian Warbler (3) and American Redstart (5). Only 2 Mourning Warblers were recorded for the fall: single individuals were found on September 2nd and the following morning of the 3rd, probably representing a single bird.

Weather during the week of September 3rd-9th was again clear and hot with merely a trickle of migrants observed. A Connecticut Warbler banded on the 7th was notable, as this cryptic species is not effectively sampled by migration monitoring in Canada. The highlight (or lowlight) of the 9th was a meager season high for Magnolia Warbler (8 DT).

Continuing high pressure for the week of September 10th-16th did little to improve numbers of birds at TTP. Blackpoll Warblers were beginning to show signs of a significant push during this period. Swainson's Thrush peaked on the 16th (11 DT). An impressive 1,700 Blue Jays were observed moving southwest along the spit in small groups on the 16th. The figure of 1,700 includes non-standard casual observations (DST).

Building southeast winds associated with hurricane Isabel led to a "fallout", on the morning of the 20th as 80 birds were banded of which 32 were Blackpoll Warblers (season high 55 DT). Comparisons to nearby migration monitoring stations on the southern Great Lakes revealed that our data was consistent with low density recorded elsewhere (up to this point). By this time, two of the three stations on Long Point, breakwater and the tip, were at ~50% of their totals in 2002.

Table 6. Banding Totals for TTP and LPBO, Aug- Sept 20th, 2003

Year	Old Cut (LPBO)	Breakwater (LPBO)	Tip (LPBO)	Tommy Thompson Park
2003	991	411	751	701
2002	1250	814	1404	-

The arrival of several late fall species seemed to immediately have an impact on numbers of birds detected. Ruby and Golden-crowned Kinglet, White-throated Sparrow, Myrtle Warbler and Hermit Thrush had all arrived by the 3rd week of September. The

only records for Indigo Bunting and Wood Thrush occurred on the 26th and 28th respectively.

The final week of September was a busy one, 312 birds were banded which was a significant increase in net productivity versus the previous weeks of the fall period. 105 birds were banded on the morning of the 29th. On this date, season high totals were recorded for Nashville (24 DT) and Black-throated Green Warbler (7 DT). However, White-throated Sparrow was the most abundant species on the day.

Overall, September was an average month, balanced by the lows of the first half and the highs of the latter half. In total, 795 birds were banded, at an average of 28 birds/day. There were 79 recapture records. Coverage was very good as 28 of 30 days were covered with banding and/or census. 2,344 net hours were logged which places the captures/net hour rate at .34.

October

During October, Sparrows, Thrushes and Kinglets are the defining families of migrants. All of these families, especially kinglets, kept us very busy in October. Weather in October is normally more inclement than August and September, which can contribute greatly to overall bird numbers.

October started off on a high note, when in the first week, 661 birds were banded. Many season highs were set in the first week including, Black-throated Blue Warbler on the 5th (5 DT), and Golden-crowned Kinglet (150 DT) and Myrtle Warbler (65 DT) on the 6th. Hermit Thrush peaked on the 7th with 44 detected on the day. Also of note were two sightings of Red-bellied Woodpecker (first on September 28th and last on October 1st).

October 6th was a significant day for the fall and for the pilot year at TTP as 245 birds were banded, 9 recaptured and 25 captured and released unbanded (279 total captures). The cold snap of the previous night was likely responsible. Fortunately, we were well staffed to ensure that birds were safely released. Banding totals by species for October 6th are presented below in Table 7.

Table 7. Banding totals-October 6, 2003

Species	Banded	Species	Banded
Black-and-White Warbler	1	Nashville Warbler	9
Blue-headed Vireo	1	Orange-crowned Warbler	3
Blue Jay	4	Ruby-crowned Kinglet	39
Brown Creeper	5	Slate-colored Junco	7
Downy Woodpecker	1	Song Sparrow	1
Eastern Phoebe	2	Sharp-shinned Hawk	1
Golden-crowned Kinglet	82	Swamp Sparrow	1
Hermit Thrush	26	Western Palm Warbler	3
Lincoln's Sparrow	2	White-throated Sparrow	14
Magnolia Warbler	1		
Myrtle Warbler	42	Total	245

Weather conditions on the 7th continued clear and cold and as a result, 108 birds were banded. Another busy morning was experienced on October 10th as 111 birds were

banded. Lincoln's sparrow peaked on this day (5 DT). The last of just 3 records of Chipping Sparrow was recorded on the 10th. The absence of this species had been a recurring concern since the beginning of the field season. 175 birds were banded on the 11th, which consisted of an impressive 96 White-throated Sparrows (160 DT). Winter Wren, a species, which turned up in good numbers throughout October, peaked at 21 detected on the 11th. The lone Savannah Sparrow of the fall was captured in net 1 on the 13th.

The period of the 12th to the 17th was less hectic than days previous, which allowed staff and volunteers to catch their breath! On many mornings in October, the presence of high numbers of birds was evident before sunrise as birds could be heard calling back and forth. The events leading to an October fallout at Tommy Thompson Park are not yet understood. A plausible scenario is not easily discernible from our weather log. Further investigation will follow.

The pre-dawn cacophony of sparrows and thrushes was evident once again on the 18th. 139 birds were banded on this day, which included 21 Slate-coloured Junco's. Despite the persistent clear and cool weather pattern, 78 and 194 were banded on the 19th and 20th respectively. Heavy movement was again sampled on the 22nd (110 banded). Between the 18th and 22nd of October, 622 birds were banded and recapture rates were unusually high (e.g. 66 on the 21st). The species responsible for the influx of stopovers were Ruby and Golden-crowned Kinglets. These birds were clearly using the insects available at Tommy Thompson Park to re-fuel. The overall recapture picture for the fall shows that birds were much more inclined to stopover for longer periods of time in October than any other month of the year.

The final week of October was far less busy as banding totals averaged 16 birds per day. A Marsh Wren was banded on the 27th and American Pipit peaked for the season at 119 detected on the 31st.

October provided a stark contrast to previous months of migration monitoring. In total, 2,111 birds were banded at a rate of 71 birds banded per day. An additional 5 birds were banded from non-standard net hours. 466 birds were recaptured. The captured/net hour rate for October was .81. Remarkably the higher detection rates were not due to a preponderance of storm fronts, as one would expect. Only 1 day of coverage was lost to weather in October as weather was for the most part quite settled.

November

Weather did finally take a turn for the worse in November as only 4 of 10 attempted dates received mist netting coverage. Wet and cold conditions made for sparse net hours. Census was completed on 8 of the 10 days. The most obvious migrant of the period was American Tree Sparrow, which is one of the first to reach Canada in the spring and one of the last to leave in the fall. American Tree Sparrow peaked at 22 detected on November 1st. Small numbers of northern finches and sparrows appeared at TTP in November, including: Pine Siskin, Common Redpoll, Lapland Longspur and Snow Bunting.

As for waterbirds, Long-tailed Ducks were gathering en masse in the harbour, over 4,000 were counted during census on November 10th, the final day of migration monitoring for 2003.

Fall Analysis

Banding

Overall, migration was surveyed on 84 of 91 attempted days (92%). Seven of the 91 days were lost to weather. 3,327 birds were banded from standard net hours (falling within daily 6 hour boundaries). 5 birds were banded from supplementary net hours. 6, 726 net hours were logged (88% of target). The birds/net hour capture rate was .49 for the fall season. The monthly summary of capture statistics presented in Table 8, shows some dramatic variation between months. October was easily the busiest period of the fall season, both for new bands and recaptures.

Table 8. Monthly Capture Statistics (Excludes 5 non-standard captures)

Month	Banded	Net Hours	Banded/net hour	Recaptures
August	293	1433	.20	59
September	795	2344	.34	79
October	2111	2597	.81	466
November	128	352	.36	19
Total	3327	6726	.49	623

Of the top ten species banded for the fall (Table 9), 7 are late fall October migrants (rank 1-7). Furthermore, the top ten species comprise 67% of the fall total. Tommy Thompson Park is an important stopover site for these species, particularly kinglets, White-throated Sparrow and Hermit Thrush. Banding data from Long Point Bird Observatory show a similar pattern as 8 of the their top ten are October/November migrants (Table 10).

Table 9. TTP Top Ten Species Banded, Fall 2003

Rank	Species	Total
1	Golden-crowned Kinglet	526
2	Ruby-crowned Kinglet	399
3	White-throated Sparrow	394
4	Hermit Thrush	186
5	Brown Creeper	140
6	Myrtle Warbler	137
7	Slate-coloured Junco	132
8	Blue Jay	123
9	Nashville Warbler	112
10	Swainson's Thrush	93

Table 10. LPBO Top Ten Species Banded, Fall 2003. Totals are from 3 stations. (Bird Studies Canada)

Rank	Species	Total
1	Myrtle Warbler	1587
2	Ruby-crowned Kinglet	731
3	Slate-coloured Junco	683
4	White-throated Sparrow	661
5	Northern-Saw Whet Owl	488
6	Golden-crowned Kinglet	413
7	American Goldfinch	392
8	Brown Creeper	365
9	White-crowned Sparrow	329
10	Swainson's Thrush	294

Ageing and Sexing is determined (where possible) on each bird, banded or recaptured. Age classes range from HY (1st calender year) to SY (2nd year) and so on. By filtering the banding data set, one can derive a ratio of young birds to adult birds. This ratio is thought to be an indicator of nest productivity for the prior summer. Young or hatch year birds are always heavily favoured in this ratio, however the year-to-year fluctuations are the indicator of breeding success. At TTP, 2,790 hatch year birds were banded, versus 498 after hatch years (82% HY). There were 44 birds, which could not be aged.

There is a positive correlation between high banding totals and high fat scores in October vs. August and September. Appendix G, shows that there were significantly higher percentages of 2 and 3 fat scores in October. This was often apparent on the days where a "fallout" had occurred (an influx of new migrants usually associated with frontal systems). The new arrivals showed very high fat scores, which is unusual as new arrivals are normally fat depleted due to the previous evenings long distance flight. This suggests that these birds staged and re-fuelled somewhere locally but got grounded for any number of reasons. This would explain the high rate of recapture, which was unique to October. October migrants are likely using the urban greenspace in the GTA as primary staging areas prior to crossing the great lakes. Of course, all migrant species are using local habitats for staging but probably not to the extent or manner shown by these species. The fragmented chain of greenspace along the Don River Valley would provide the means by which this may happen. Suitable habitat for stopover is especially critical in the southern Great Lakes along shorelines, because these are crossing points. Stopover habitat is described as such:

> The term "Stopover Habitat" describes the set of habitats that birds select during migration. Ideal stopover sites provide accessible water, protection, and food so that birds can not only survive but also regain energy lost during their travels. Spatial distribution of such sites at a continental scale is important (Duncan et.al.2002).

Compared to breeding and wintering habitats, little has been investigated with respect to environments that migrants use en route. An instructive example is that of the Black-throated Blue Warbler which was found to have an 85% adult mortality rate during migration (Sillett and Holmes 2002).

Recaptures

There were 623 recaptures in fall, 2003. 621 were recaptures of birds banded either in spring (return) or fall (repeat). 293 of these recaptures were kinglets. With the colder weather in October, Ruby-crowned and Golden-crowned Kinglets were especially prone to linger at TTP to regenerate their fat stores. There were two encounters of birds banded elsewhere (foreign recoveries), a Hermit Thrush and a Sharp-shinned Hawk. Information on the origins of the Hermit Thrush encounter is not yet available.

Foreign Recoveries

	Species	**Band**	**Age**	**Sex**	**Date**	**Location**
Banded	Sharp-shinned Hawk	1152-12933	HY	M	30/8/2000	Hurricane Mount., NY
Recapture	"	"	ASY	M	24/10/2003	Tommy Thompson Park, ON

	Species	**Band**	**Age**	**Sex**	**Date**	**Location**
Banded	Hermit Thrush	1871-44255	SY	U	1/5/2003	Rocky Ridge, Ohio
Recapture	"	"	AHY	U	7/10/2003	Tommy Thompson Park, ON

Table 11. Recaptures, Fall 2003

Species	Recap	Foreign	Species	Recap	Foreign
American Goldfinch	3		Hermit Thrush	51	1
American Redstart	6		Magnolia Warbler	14	
American Robin	3		Myrtle Warbler	6	
Black-and-White Warbler	3		Nashville Warbler	6	
Bay-breasted Warbler	3		Northern Cardinal	3	
Black-capped Chickadee	55		Orange-crowned Warbler	2	
Blue-headed Vireo	1		Ovenbird	1	
Blue Jay	2		Ruby-crowned Kinglet	110	
Blackpoll Warbler	1		Slate-colored Junco	4	
Brown Creeper	18		Song Sparrow	11	
Brown Thrasher	1		Sharp-shinned Hawk	1	1
Black-throated Blue Warbler	5		Swainson's Thrush	18	
Black-throated Green Warbler	2		Traill's Flycatcher	2	
Cedar Waxwing	2		Veery	6	
Common Yellowthroat	1		Warbling Vireo	4	
Chestnut-sided Warbler	3		Wilson's Warbler	6	
Downy Woodpecker	1		Winter Wren	4	
Eastern Phoebe	2		Western Palm Warbler	2	
Eastern Wood-Pewee	1		White-throated Sparrow	37	
Fox Sparrow	3		Yellow-shafted Flicker	2	
Golden-crowned Kinglet	183		Yellow Warbler	8	
Gray-cheeked Thrush	2				
Gray Catbird	22		Total	621	2

Captured-Unbanded

Captured-Unbanded is a category of captured birds that are released without a band. These individuals are released due to either: stress, injury, excessive capture volume, or accidentally due to escape. Table 12 presents a summary of captured-unbanded totals. Significant portions of the total are kinglets and Myrtle Warblers, which were released on busy days because of excessive capture. When necessary, birds are released according to relative sample size. Ruby-throated Hummingbirds require a special banding permit and are therefore released at the time of capture.

Table 12. Captured-unbanded, Fall 2003

Species	Number	Species	Number
American Tree Sparrow	1	Myrtle Warbler	12
Black-capped Chickadee	1	Ruby-crowned Kinglet	33
Blue Jay	5	Ruby-throated Hummingbird	17
Brown Creeper	3	Slate-coloured Junco	9
Black-throated Blue Warbler	1	Sharp-shinned Hawk	6
Black-throated Green Warbler	1	Tennessee Warbler	1
Common Yellowthroat	1	Veery	1
Eastern Phoebe	1	White-crowned Sparrow	3
European Starling	2	Winter Wren	2
Field Sparrow	1	White-throated Sparrow	5
Golden-crowned Kinglet	39	Yellow-shafted Flicker	1
Hermit Thrush	3	Yellow Warbler	2
Magnolia Warbler	1	Total	152

Species Coverage

Fall migration monitoring was successful with respect to species coverage. The inclusion of a daily census was integral for this success. Based on Bird Studies Canada's species priority ranking, 14 of 17 priority A, 10 of 20 priority B, 11 of 22 priority B, and 19 of 24 priority D species were monitored. Furthermore, few of these species are considered perennial breeders or long-term residents at Tommy Thompson Park. This is important for species trends, as it becomes difficult to distinguish between local and transient populations where this conflict occurs.

There were some gaps in species coverage, some of which can be addressed by adjustments in length of coverage (starting two weeks earlier in August). Several of the species not monitored in fall, 2003 are either species only covered by northern stations (8 species) or species not successfully monitored at any CMMN member station (Leconte's Sparrow, Connecticut Warbler).

Savannah Sparrow and Cape May Warbler are the two priority A species that are being monitored on the southern great lakes but not at TTP. There was only 1 record of Savannah Sparrow in fall, 2003. This species is known to breed locally. There were 7 records of Cape May Warbler on 7 dates this past fall. The addition of another standard survey could improve detection of this species.

Priority B species which could be monitored at TTP include: Common Redpoll, Snow Bunting and Lapland Longspur. Extending coverage into November and/or survey adjustments could improve this.

There are 6 priority B species that could be monitored at TTP in the future. Three species, Mourning Warbler, Chipping Sparrow and Common Nighthawk are not likely to be found in sufficient quantities for monitoring. Adjusting monitoring approach can monitor some or all of: Canada Warbler, Eastern Kingbird, Cliff Swallow, Philadelphia Vireo, Tree Swallow, and Bank Swallow.

It is unlikely that any of the priority D species not monitored by fall 2003 data, could be monitored by changes to approach.

Therefore, there are 11 species that could be monitored in subsequent fall migration seasons by adjusting the monitoring regime. These changes will not affect current status of other species already monitored successfully. Changes to the protocol will be additive rather than reductive. This will be carefully considered for next year

Table 13. Fall Species Coverage Summary

Criteria	Priority A	Priority B	Priority C	Priority D	Total
Great Lakes target species	17	20	22	24	83
Species monitored at TTP (fall)	14	10	11	19	54
Breeders/residents	0	1	5	11	17

Net Analysis

Eighteen net locations were tested in fall, 2003. This section will assess individual productivity for each net location.

The net assemblage is located in a relatively uniform habitat, early succession cottonwood, birch and willow. There are moderate shifts in age and density between net locations. A comprehensive habitat assessment is available at TRCA offices for the monitoring of any habitat changes over time.

There is some polarity in the data presented in Table 14, in terms of individual net location productivity. The banded/net hour percentages are highest for nets: A (1.01/hour), one (.86), B (.81/hour) ten (.75) and net two (.71). Nets 1, 10 and A, were new locations. Net 1 and 10 were installed in August (during fall setup) and A and B were installed on September 26th. Nets 1 and 2 (1,2) and nets 10, A, and B (10,A, B) are located at opposite ends of the count area. The habitats at each end are distinct from each other. Nets 1-2 are located in more open meadow habitat with mid succession cottonwood, birch and stunted willow. Nets 10, A and B are located in more mature cottonwood stand with red osier dogwood under story. Some silver maple is interspersed which is a reflection of higher soil quality in the area.

The high capture rates of net 10 and the prevalence of warblers detected in the area on census led to the addition of nets A and B in late September. However, by this time, the majority of the warbler species had moved south. It is believed that the operation of these nets in August and September, will aid in improving totals for warblers.

The ideal number of nets is 12-15, and therefore, some of the net locations detailed below will be retired. This will likely be 7, 11 and 16 as the rate of capture for these nets is too low to be effective.

Table 14. Net Analysis, Fall (Total Captured includes 5 NSB records)

Net	Hours of Operation	Total Captured	Captured/Net Hour
1	451	387	.86
2	445	317	.71
3	452	208	.46
4	451	159	.35
5	452	138	.31
6	452	157	.35
7	444	130	.29
8	451	188	.42
9	452	235	.52
10	443	334	.75
11	73	3	.04
12	447	150	.34
13	445	177	.40
14	447	154	.34
15	448	256	.57
16	3.5	2	.57
A	187	188	1.01
B	185	149	.81
Totals	6728.5	3332	.495

Personnel

Twenty-four volunteers contributed 1,285 volunteer hours to fall migration monitoring. This was an exceptional group of people to work with and I thank them for their efforts. Most of the volunteers were new to bird banding and as such, received training when desired. This is part of the education initiative taken by TRCA and TBO to provide an opportunity for amateur birders and naturalists to be exposed to and participate in ornithological research.

TRCA and TBO were very pleased to receive so many requests to assist with operations at Tommy Thompson Park Bird Research Station. This is a reflection of the public's appreciation for birds and the health of their populations.

Table 15. Volunteer Effort, Fall

Name	Hours	Name	Hours	Name	Hours
Seabrooke Leckie	275	Larissa Neumann	46	Patrick Scanlon	13
Mike Boyd	165	Michelle Nelson	38	John Brett	13
Ian Sturdee	126	Barbara Myers	36	Attila Fust	11
Mary Boswell	90	Paul Prior	35	Steve Stockton	11
Shuang Xu	82	Tove Christensen	35	Jan MacDonald	10
Monica Awasthy	73	Sandra Znajda	32	Jamie Good	9
Diego Garcia-Bellido	70	Richard Joos	25	Tania Havelka	6
Knud Rasmussen	64	Emma Followes	14	Dan Zabelishensky	6
				Total	1285

SPRING AND FALL DISCUSSION

The pilot migration monitoring project at Tommy Thompson Park was positive in light of the data collected and the prospects for long-term research and education.

In 2003, some 4,202 birds were banded and 786 were recaptured, including 3 foreign recoveries. The combined capture rate per net hour for spring and fall was .50.

Spring, 2003 was promising in terms of species coverage, however the season was actually a small sample of what can be done in the future. An earlier start date (April 1st) and the necessary adjustments in protocol (census) will ensure that spring coverage is comprehensive. Table 16, presents a summary of statistics for both seasons, side by side. Surprisingly, the capture rate was higher in the spring than in the fall. As mentioned earlier, net hours were sparse in the spring (55% completed on attempted dates). Improved coverage in future years will hopefully result in higher detection rates for priority species.

The spring was a success in terms of the number of volunteers that set aside time to assist with the project. This enthusiasm will ensure that there will be sufficient personnel available to run the program in the future.

Fall 2003 was very positive in terms of overall coverage. Species coverage is quite strong, but as with the spring, can still be improved with changes to monitoring approach. Banding coverage was good as only 12% was lost to bad weather. The fall capture rate of .49 vs. .80 for October is an indicator of the dearth of birds in August and most of September.

Table 16. Spring and Fall comparison (Captures/net hour includes banding totals only)

	Volunteer Hours	Banded	Recap	Captures/net hour	% Of Net Coverage
Spring	727	870	163	.51	55
Fall	1285	3327	623	.49	88
Totals	2012	4202	786	.50	72

The outlook for next year is encouraging as monitoring in 2003 has established a baseline by which comparisons can be made. During the off season, a protocol for migration monitoring, an operations manual and education materials will be in place to firmly establish methodology. TRCA and TBO have created a joint management committee to enable appropriate communication and delegation of tasks to both parties. Both parties are enthusiastic about the developments of the past year and wish to work diligently towards achieving project goals.

Historical Perspective

Toronto Bird Observatory has been collecting data on migrant landbirds on the Toronto lakeshore since 1978. This data provides a valuable comparison for migration monitoring results at TTP in 2003 and previous years on Mugg's Island. Analysis presented here is limited by the variation in effort and protocol between data sets. However, the comparison offers a broader perspective of landbird migration on Toronto's waterfront.

Table 17 is a multi-year summary of banding statistics from Mugg's Island for comparison to TTP in 2003. It is rather dubious to make any assumptions here with respect to migrant abundance, however, the capture rates average higher for Mugg's Island in both spring and fall. This is especially significant for spring analysis where the effort is relatively consistent. However, data for spring migration monitoring at Mugg's spans March-June, a range not yet attained at TTP. Conversely, the range in fall sample size is too great for a meaningful comparison.

Table 17. Comparison of TTP and Mugg's Island Banding Totals

Season	Year	Banded	Species Banded	Net Hours	Captured per Net Hour
Spring	2000	1138	63	1619	.70
	2001	367	50	937	.39
	2002	1257	71	2146	.59
	2003 (TTP)	870	66	1719	.51
Fall	1999	650	64	1238	.53
	2000	1003	73	1600	.63
	2003 (TTP)	3327	81	6726	.49

Tables 18 and 19 reveal some interesting similarities and contrasts in terms of species representation. White-throated Sparrow, Ruby and Golden-crowned Kinglets and Hermit Thrush are the most abundant species migrating through both locations (exception of spring 2003 due to late start date). Magnolia Warbler appears to be more numerous on the Toronto Islands than at Tommy Thompson Park. Brown Creeper, Blue Jay, Myrtle Warbler, Gray-cheeked Thrush and American Goldfinch are featured in the top ten for either the spring or fall at TTP but not Mugg's Island. There are no banding records of Cape May Warbler from Mugg's island, while 5 were banded at TTP in fall 2003.

Chipping, Savannah and White-crowned Sparrow are not represented well at either site. This is unusual given the relatively high population size of these species. It is reasonable to assume that these species are selecting stopover habitats not found at either banding location (more flat, open habitats are widely available locally).

Table 18. Top Ten Species Banded During Spring, Mugg's and TTP

	Mugg's Island				Tommy Thompson Park	
Rank	2000	Band	2002	Band	2003	Band
1	WTSP	230	WTSP	317	SWTH	86
2	HETH	116	MAWA	83	YWAR	51
3	MAWA	87	HETH	80	MAWA	48
4	SWTH	76	RCKI	76	WTSP	47
5	RCKI	72	COYE	73	GRCA	43
6	GCKI	48	YWAR	50	COYE	41
7	AMRE	37	GRCA	49	AMGO	37
8	SCJU	30	SWTH	43	LEFL	36
9	GRCA and BTBW	29	AMRE	30	GCTH and MYWA	29
10	COYE	27	SWSP	27	LISP	27

Table 19. Top Ten Species Banded During Fall, Mugg's and TTP

	Mugg's Island		Tommy Thompson Park	
Rank	2000	Band	2003	Band
1	GCKI	143	GCKI	526
2	HETH	117	RCKI	399
3	RCKI	88	WTSP	394
4	WTSP	77	HETH	186
5	MAWA	67	BRCR	140
6	NAWA	64	MYWA	137
7	SWTH	32	SCJU	132
8	AMRO	27	BLJA	123
9	SCJU	25	NAWA	112
10	AMRE	24	SWTH	93

A thorough picture of diversity at both sites is presented in Appendix j.

SAW-WHET OWL MONITORING

A pilot Saw-whet Owl monitoring project was launched in October 2003. The purpose of this project was to assess the abundance of migrating Northern Saw-whet Owls at Tommy Thompson Park. We chose the existing banding location on peninsula D for this project.

Owl monitoring is facilitated by nocturnal mist netting during migration. An audio lure, playing looped Saw-whet calls is required to produce an adequate sample size. The lure was placed in the center of a triangular net arrangement. Two of the nets in the triangle were 60mm mesh diameter and one was 30mm. A variable number of "passive" nets (30mm) were used in conjunction with the triangle. The standard capture period was for four hours, all captures beyond this limit were recorded as non-standard.

Monitoring was conducted on 18 evenings, starting on October 20th and ending on November 21st. Paolo Viola spearheaded this project with the assistance of several volunteers. In total, 179 Northern Saw-whets and 1 Long-eared were banded. There

were four recaptures encountered, 3 of which were foreign recoveries. The incidence of foreign recovered Saw-whets is much higher than that for smaller landbirds. A summary of owl recaptures is presented in Table 20.

Table 20. Summary of Owl Recaptures

Status	Band	Species	Age	Sex	Wing	Wt.	Fat	Day	Month	Year	Trap Type	Trap #
F	0924-06286	NSWO	2	0	130	84.8	3	1	11	2003	MN	10
F	1204-27346	NSWO	2	5	139	107.7	2	1	11	2003	MN	10
R	0844-30250	NSWO	6	0	135	84.1	2	9	11	2003	MN	A
F	0764-35217	NSWO	2	0	133	83.2	2	?	11	2003	MN	08

Owls were captured on 16 of the 18 attempted nights and the peak abundance was reached on November 1st when 61 Saw-whets were banded at a rate of 2 per net hour (or 200 per 100 net hours)! Weather was the most significant determinant of Saw-whet abundance on any given night. Calm and clear conditions are ideal for Saw-whet Owl migration.

Table 21. Owl Monitoring Capture Statistics (Captures/net hour includes all captured birds)

Date	No. of Nets	Standard hours	Non-Standard hours	Total Hours	Total Captures	Captures/net hour
Oct-20	7	28		28	2	0.07
Oct-21	7	28	8.75	36.75	1	0.03
Oct-22	7	28	31.5	59.5	26	0.44
Oct-23	7	28		28	33	1.18
Oct-24	7	28		28	6	0.21
Oct-25	7	10.5		10.5		0
Oct-29	7	10.5		10.5	1	0.09
Oct-30	7	28		28	2	0.07
Nov-01	8	30.5		30.5	61	2
Nov-05	9	36	25	61	14	0.23
Nov-06	9	36		36	4	0.11
Nov-08	9	36		36	18	0.5
Nov-09	11	42.5		42.5	3	0.07
Nov-10	9	36		36	1	0.03
Nov-14	9	35	1	36	2	0.05
Nov-15	9	36		36	9	0.25
Nov-20	9	36	9	45	1	0.02
Nov-21	9	36		36		0
		549	75.25	624.25	184	0.29

The results of the Saw-whet Owl Monitoring project indicate that Tommy Thompson Park is an important stopover site for migrating owls on their southward migration. Therefore, the prospect of long term monitoring is optimistic, however at the time of this writing, it is unclear as to whether this objective will be taken by the Management Committee.

EDUCATION

Tommy Thompson Park Bird Research Station has considerable potential for public education. Close proximity to a major urban center is unique among the current roster of CMMN migration monitoring stations. Tommy Thompson Park is currently open to the public on weekends, but will be a daily access park within 10 years. Many visitors use the main road of the spit for recreational activities, including the exploration of the park's natural history. Plans are in place for a fully organized education program at the research station. This plan includes interpretive displays and tiered curriculums for school groups.

RECOMMENDATIONS

Protocols

- Prior to the start of migration monitoring in 2004, a protocol entitled "Operations Manual: Tommy Thompson Park Bird Research Station" will be prepared. A thorough protocol will ensure that staff and volunteers understand the migration monitoring routine (migration monitoring protocol section).

- The document will also contain procedures for the safe and efficient management of the research station (operations section).

Staffing

-In 2003, we were fortunate to have two experienced staff running the station (Viola and Derbyshire). This enabled us to focus more attention on the volunteer training. The volunteer base is not yet established and therefore, extra staffing is required in 2004 to continue training initiative and also manage station operations. This is particularly important now as the education directive kicks into gear this coming May. I recommend a Migration Monitoring Coordinator (station supervisor) as well as a paid assistant who has significant banding and birding experience. The wage for an assistant bander position in Canada ranges from 600(stipend) to 2000+ for more experienced candidates. The opportunity to gain experience is an incentive here although the trend towards inadequate living wages for field technicians is damaging. At the time of this writing, field technicians are evaluating positions for the upcoming field year. It is crucial that a decision be made as soon as possible with respect to future staffing arrangements.

Education

Education is a key component of activities at Tommy Thompson Park Bird Research Station. In order to successfully balance research and education, it is critical that the station is well staffed and that there is substantial communication and planning with respect to scheduled events. The creation of the Management Committee is the first step towards this aim. The following points need to be considered by the committee.

- Education Interpreters must be trained in bird handling in April 2004.
- Banding lab is off limits to large groups (5 max).

- A mobile interpretive display should be employed to aid interpreters. The display should emphasize bird populations and role of migration monitoring and bird banding for that goal. Little or no emphasis on band recoveries.
- Banding is cancelled on days with precipitation, very high wind or extreme hot or cold temperatures.
- From August-late September in the fall and mid-May-June in the spring, educators should plan to be at the research station as early as possible. From mid-September-November and from April-early May, plan to be at the station later in the morning.
- Netting area is off-limits (except for main path) to large groups. Visitation to a net can be pre-arranged through Migration Monitoring Coordinator only. Heavy traffic in the netting area improperly affects bird movement and detection.
- Groups should see the banding as the first activity on the day. Seeing birds in the hand before binoculars is essential for overall impact.
- Noise kept to a minimum inside banding lab and when walking near net lanes.
- Emphasize the contemporary purposes of banding at migration monitoring station. Recoveries are the smallest part.
- Talks are primarily conducted outside the banding lab. Interpreters or a volunteer (if available) will hold birds for demonstration.
- Birds cannot be kept longer than a few minutes for demonstration.
- Use of the photographers grip in demonstrations will be minimal. Migration Monitoring Coordinator will decide whether or not it can be used and for how long. It is preferable to use banders grip as much as possible.
- Birds will not be kept waiting in a bag longer than 15 minutes after banding.
- Some species won't be used for demonstration based on availability of appropriate staff (some species require significant handling experience).

Interpretative signs

Signs will be beneficial for both education and site security. Tommy Thompson Bird Research Station is located within a public park and is therefore at risk of vandalism, theft and misuse. To discourage such acts, signs should be installed at major trailheads centered on the parking loop. The signs should be informative rather than dismissive. They should effectively portray the aim of the research and the importance and sensitivity of the equipment.

Equipment/Facilities updates

The following would be useful in 2004.

- 5 avinet 9m. (30 mm)
- Weed whacker
- Jenni and Winkler
- Digital camera
- Owl nets
- Flooring
- Signs (see above)
- Screening for windows to prevent indoor bird strikes.
- Improved lighting (electrical)
- Change outside shutters
- Band spreaders
- Checklist for banding lab entrance

Volunteer recruitment, co-ordination and training

- Recruiting volunteers will be an ongoing process for the partnership. A screening process should be utilized to maximize projected coverage. An online application is necessary for this. The author designed such an application for Rocky Point Bird Observatory in 2000. Volunteers will be evaluated based on skills and availability and will receive training accordingly. Advertising and recruitment should begin immediately for the approaching spring and fall seasons.

- The Migration Monitoring Coordinator should co-ordinate volunteer schedules.

- Volunteer training procedures will be extensively detailed in "Operations Manual: Tommy Thompson Park Bird Research Station."

Website

The TBO website provides an excellent base from which to inform and promote our objectives. The following are recommendations for website development:

- More pictures of the site, birds and banding activities.
- Detail current projects (migration monitoring, owl monitoring)
- Volunteer application form in pdf format
- Information on what volunteers can expect by participating.
- Table of gate meeting times for the entire spring and fall 2004 season.
- Brief reports on migration seasons.
- Sightings page
- Map of how to get to the station (driving, bus, etc.)
- Current website is not on search engine radar. Key words (Toronto, bird, banding, observatory, spit, Tommy Thompson Park, migration monitoring etc.)

Promotion

The TTP Bird Research Station should be promoted to various ornithological organizations. This will serve to attract outside interest (volunteers, researchers) and also to initiate dialogue between key organizations. The following are some organizations that could be targeted:

- Bird Studies Canada
- Canadian Wildlife Service
- Ontario Bird Banding Association
- Toronto Field Naturalists
- Toronto Ornithological Club
- Friends of the Spit
- American Birding Association
- Sailing Club
- Universities (U of T, York, Guelph, Waterloo)

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Appendices

Appendix A. TTP Spring Banding Totals, 2003 (alpha order)

Species	Total	Species	Total
American Goldfinch	37	Least Flycatcher	36
American Redstart	25	Lincoln's Sparrow	27
American Robin	8	Magnolia Warbler	48
Bank Swallow	1	Mourning Warbler	6
Baltimore Oriole	6	Myrtle Warbler	29
Barn Swallow	3	Nashville Warbler	18
Black-and-White Warbler	4	Northern Cardinal	3
Bay-breasted Warbler	2	Northern Waterthrush	7
Black-capped Chickadee	2	Northern Rough-winged Swallow	4
Brown-headed Cowbird	4	Orange-crowned Warbler	1
Blackburnian Warbler	3	Ovenbird	13
Blackpoll Warbler	8	Philadelphia Vireo	2
Brown Thrasher	10	Rose-breasted Grosbeak	3
Black-throated Blue Warbler	11	Ruby-crowned Kinglet	21
Black-throated Green Warbler	4	Red-eyed Vireo	6
Canada Warbler	5	Red-winged Blackbird	23
Chipping Sparrow	2	Savannah Sparrow	1
Common Grackle	4	Scarlet Tanager	2
Common Yellowthroat	41	Song Sparrow	17
Chestnut-sided Warbler	8	Swamp Sparrow	4
Eastern Kingbird	4	Swainson's Thrush	86
Eastern Phoebe	2	Tennessee Warbler	1
Eastern Towhee	1	Tree Swallow	6
Eastern Wood-Pewee	4	Traill's Flycatcher	22
European Starling	11	Veery	9
Eastern White-crowned Sparrow	21	Warbling Vireo	8
Field Sparrow	1	Wilson's Warbler	19
Great Crested Flycatcher	1	Wood Thrush	1
Gray-cheeked Thrush	29	Western Palm Warbler	19
Gray Catbird	43	White-throated Sparrow	47
Hermit Thrush	14	Yellow-bellied Flycatcher	4
House Wren	2	Yellow-shafted Flicker	2
Indigo Bunting	3	Yellow Warbler	51
		Total	870

Appendix B. Spring Species List (124 total)

Common Loon
Pied-billed Grebe
Double-crested Cormorant
American Bittern
Great Blue Heron
Great Egret
Black-crowned Night Heron
Mute Swan
Canada Goose
American Black Duck
Mallard
Gadwall
Greater Scaup
Lesser Scaup
Long-tailed Duck
Bufflehead
Common Merganser
Red-breasted Merganser
Northern Harrier
Sharp-shinned Hawk
American Kestrel
Black-bellied Plover
Killdeer
Greater Yellowlegs
Spotted Sandpiper
Whimbrel
Ruddy Turnstone
Dunlin
Common Snipe
American Woodcock
Bonaparte's Gull
Ring-billed Gull
Herring Gull
Great Black-backed Gull
Caspian Tern
Common Tern
Mourning Dove
Black-billed Cuckoo
Common Nighthawk
Chimney Swift
Ruby-throated Hummingbird
Belted Kingfisher
Northern Flicker
Eastern Wood-Pewee
Yellow-bellied Flycatcher
Trail's Flycatcher
Least Flycatcher
Eastern Phoebe
Great-crested Flycatcher
Eastern Kingbird
Purple Martin
Tree Swallow
Northern Rough-winged Swallow
Bank Swallow
Cliff Swallow
Barn Swallow
Blue Jay
American Crow
Black-capped Chickadee
House Wren
Marsh Wren
Ruby-crowned Kinglet
Blue-gray Gnatcatcher
Veery
Gray-cheeked Thrush
Swainson's Thrush
Hermit Thrush
Wood Thrush
American Robin
Gray Catbird
Brown Thrasher
American Pipit
Cedar Waxwing
European Starling
Blue-headed Vireo
Warbling Vireo
Philadelphia Vireo
Red-eyed Vireo
Tennessee Warbler
Orange-crowned Warbler
Nashville Warbler
Yellow Warbler
Chestnut-sided Warbler
Magnolia Warbler
Cape May Warbler
Black-throated Blue Warbler
Yellow-rumped Warbler
Black-throated Green Warbler
Blackburnian Warbler
Palm Warbler
Bay-breasted Warbler
Blackpoll Warbler
Black and white Warbler
American Redstart
Ovenbird
Northern Waterthrush
Mourning Warbler
Common Yellowthroat
Hooded Warbler
Wilson's Warbler
Canada Warbler
Scarlet Tanager
Northern Cardinal
Rose-breasted Grosbeak
Indigo Bunting
Eastern Towhee
Chipping Sparrow
Field Sparrow
Savannah Sparrow
Song Sparrow
Lincoln's Sparrow
Swamp Sparrow
White-throated Sparrow
White-crowned Sparrow
Dark-eyed Junco
Bobolink
Red-winged Blackbird
Rusty Blackbird
Common Grackle
Brown-headed Cowbird
Baltimore Oriole
House Finch
American Goldfinch
House Sparrow

Appendix C. Priority Species For Spring Migration Monitoring At Tommy Thompson Park. Includes only species expected in the Great Lakes region. Species in Bold are being successfully monitored based on banding data from 2003.

Priority A. Species with <50% of North American breeding range covered by BBS, and <60% of their winter range in U.S. and Canada. 5/17

Alder Flycatcher
American Pipit
Bay-breasted Warbler
Blackpoll Warbler
Cape May Warbler
Connecticut Warbler
Gray-cheeked Thrush
Lincoln's Sparrow
Magnolia Warbler
Northern Waterthrush
Orange-crowned Warbler
Savannah Sparrow
Swainson's Thrush
Tennessee Warbler
Wilson's Warbler
Yellow-bellied Flycatcher
Yellow-bellied Sapsucker

Priority B. Species with <50% of North American breeding range covered by BBS, but 60% of winter range in U.S. and Canada. 4/20

American Tree Sparrow
Bohemian Waxwing
Boreal Chickadee
Common Redpoll
Dark-eyed Junco
Fox Sparrow
Harris Sparrow
Lapland Longspur
Leconte's Sparrow
Myrtle Warbler
Northern Shrike
Pine Grosbeak
Ruby-crowned Kinglet
Rusty Blackbird
Snow Bunting
Swamp Sparrow
Western Palm Warbler
White-crowned Sparrow
White-throated Sparrow
White-winged Crossbill

Priority C. Species with <60% of their Canadian and Alaskan breeding range covered by BBS, and <60% of their winter range in U.S. and Canada. 5/22

American Redstart
Black-and-white Warbler
Black-throated Green Warbler
Bank Swallow
Barn Swallow
Blue Headed Vireo
Canada Warbler
Chipping Sparrow
Clay-coloured Sparrow
Cliff Swallow
Common Nighthawk
Common Yellowthroat
Eastern Kingbird
Least Flycatcher
Mourning Warbler
Olive-sided Flycatcher
Ovenbird
Philadelphia Vireo
Red-eyed Vireo
Tree Swallow
Warbling Vireo
Yellow Warbler

Priority D. 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 U.S. and Canada. 4/24

American Crow
American Robin
Black-capped Chickadee
Belted Kingfisher
Brown Creeper
Cedar Waxwing
Common Grackle
Downy Woodpecker
Eastern Phoebe
European Starling
Golden-crowned Kinglet
Great-crested Flycatcher
Hairy Woodpecker
Hermit Thrush
Horned Lark
Marsh Wren
Northern Flicker
Pine Siskin
Purple Finch
Red-breasted Nuthatch
Red-winged Blackbird
Song Sparrow
Vesper Sparrow
Winter Wren

Appendix D. TTP Fall Banding Totals (alpha order). Non-standard captures are in shown in brackets.

Species	Banded	Species	Banded
American Goldfinch	2	Least Flycatcher	21
American Redstart	38	Lincoln's Sparrow	16
American Robin	38	Magnolia Warbler	76
American Woodcock	2	Marsh Wren	1
American Tree Sparrow	50	Mourning Warbler	1
Baltimore Oriole	4	Myrtle Warbler	137
Black-and-White Warbler	9	Nashville Warbler	112
Bay-breasted Warbler	4	Northern Cardinal	8
Black-capped Chickadee	32 (1)	Northern Parula	3
Blue-headed Vireo	11	Northern Waterthrush	17
Blackburnian Warbler	1	Northern Shrike	1
Blue Jay	123	Northern Saw-whet Owl	1
Blackpoll Warbler	53	Orange-crowned Warbler	17
Brown Creeper	139 (1)	Ovenbird	16
Brown Thrasher	3	Philadelphia Vireo	4
Black-throated Blue Warbler	31	Purple Finch	2
Black-throated Green Warbler	20	Rose-breasted Grosbeak	2
Canada Warbler	5	Red-breasted Nuthatch	2
Cedar Waxwing	19	Ruby-crowned Kinglet	399
Cape May Warbler	5	Red-eyed Vireo	13
Cooper's Hawk	1	Red-winged Blackbird	2
Connecticut Warbler	1	Savannah Sparrow	1
Common Yellowthroat	17	Slate-colored Junco	132
Chestnut-sided Warbler	21	Song Sparrow	64
Downy Woodpecker	3	Sharp-shinned Hawk	15
Eastern Kingbird	2	Swamp Sparrow	25
Eastern Phoebe	27	Swainson's Thrush	93
Eastern Towhee	2	Tennessee Warbler	16
Eastern Wood-Pewee	5	Traill's Flycatcher	32
European Starling	13	Veery	21
Eastern White-crowned Sparrow	19	Warbling Vireo	14
Field Sparrow	5	White-crowned Sparrow	2
Fox Sparrow	17 (1)	Wilson's Warbler	29
Great Crested Flycatcher	3	Winter Wren	52
Golden-crowned Kinglet	525 (1)	Wood Thrush	1
Gray-cheeked Thrush	23	Western Palm Warbler	31
Gray Catbird	42	White-throated Sparrow	394
Gambel's White-crowned Sparrow	2	Yellow-bellied Flycatcher	11
Hermit Thrush	185 (1)	Yellow-bellied Sapsucker	6
House Wren	1	Yellow-shafted Flicker	14
		Yellow Warbler	20
81 species		Total	3327 (5)

Appendix E. Priority Species For Fall Migration Monitoring At Tommy Thompson Park. Includes only species expected in the Great Lakes region. Species in Bold are being successfully monitored based on banding data from 2003. Species are considered monitored if at least 10 preferably 20 individuals are recorded on an average of 5 dates per season.

Priority A. Species with <50% of North American breeding range covered by BBS, and <60% of their winter range in U.S. and Canada. 14/17

Alder Flycatcher*	**Gray-cheeked Thrush**	**Swainson's Thrush**
American Pipit	**Lincoln's Sparrow**	**Tennessee Warbler**
Bay-breasted Warbler	**Magnolia Warbler**	**Wilson's Warbler**
Blackpoll Warbler	**Northern Waterthrush**	**Yellow-bellied Flycatcher**
Cape May Warbler	**Orange-crowned Warbler**	**Yellow-bellied Sapsucker**
Connecticut Warbler	Savannah Sparrow	

*Species inseparable from Willow Flycatcher. Traills Flycatcher recorded in sufficient quantity.

Priority B. Species with <50% of North American breeding range covered by BBS, but 60% of winter range in U.S. and Canada. 10/20

American Tree Sparrow	Lapland Longspur	Snow Bunting
Bohemian Waxwing	Leconte's Sparrow	**Swamp Sparrow**
Boreal Chickadee	**Myrtle Warbler**	**Western Palm Warbler**
Common Redpoll	Northern Shrike	**White-crowned Sparrow**
Dark-eyed Junco	Pine Grosbeak	**White-throated Sparrow**
Fox Sparrow	**Ruby-crowned Kinglet**	White-winged Crossbill
Harris Sparrow	**Rusty Blackbird**	

Priority C. Species with <60% of their Canadian and Alaskan breeding range covered by BBS, and <60% of their winter range in U.S. and Canada. 11/22

American Redstart	Clay-coloured Sparrow	**Ovenbird**
Black-and-white Warbler	Cliff Swallow	Philadelphia Vireo
Black-throated Green Warbler	Common Nighthawk	**Red-eyed Vireo**
Bank Swallow	**Common Yellowthroat**	Tree Swallow
Barn Swallow	Eastern Kingbird	**Warbling Vireo**
Blue Headed Vireo	**Least Flycatcher**	**Yellow Warbler**
Canada Warbler	Mourning Warbler	
Chipping Sparrow	Olive-sided Flycatcher	

Priority D. 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 U.S. and Canada. 19/24

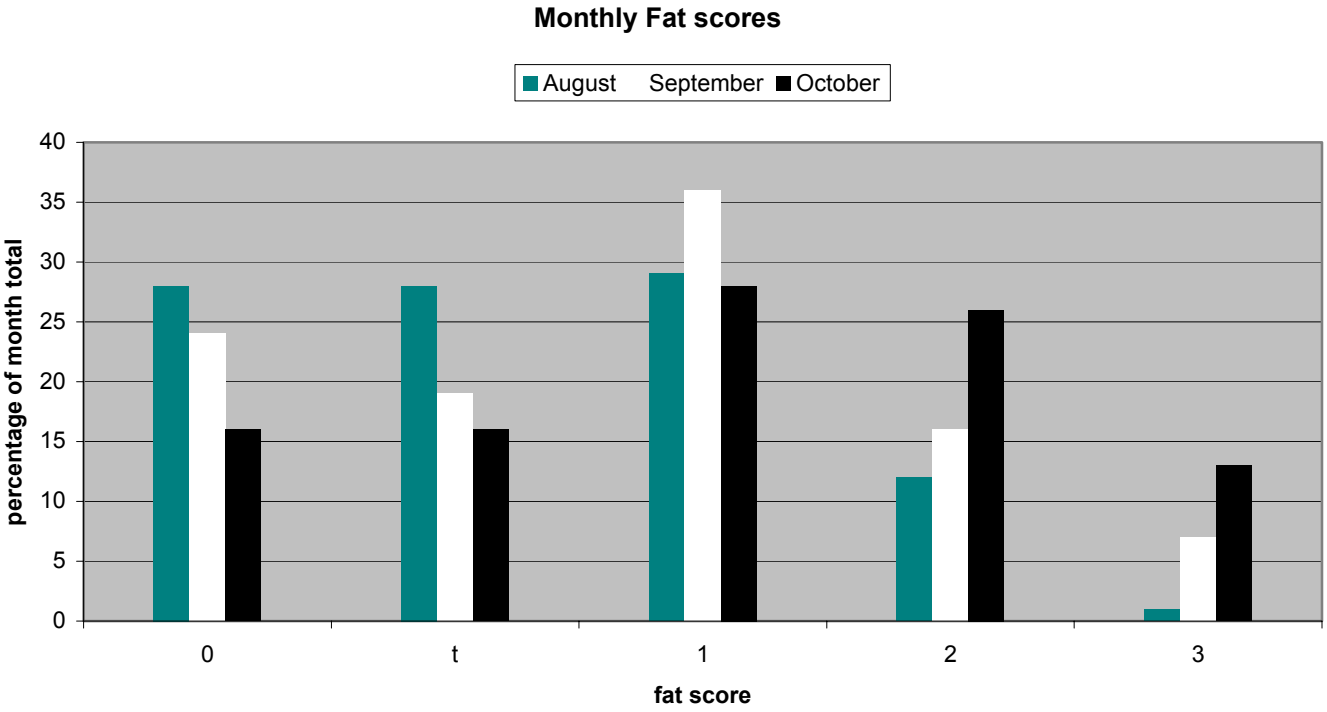
American Crow	**Eastern Phoebe**	**Northern Flicker**
American Robin	**European Starling**	Pine Siskin
Black-capped Chickadee	**Golden-crowned Kinglet**	**Purple Finch**
Belted Kingfisher	**Great-crested Flycatcher**	**Red-breasted Nuthatch**
Brown Creeper	Hairy Woodpecker	**Red-winged Blackbird**
Cedar Waxwing	**Hermit Thrush**	**Song Sparrow**
Common Grackle	Horned Lark	Vesper Sparrow
Downy Woodpecker	Marsh Wren	**Winter Wren**

Appendix F. Capture Totals, Spring and Fall 2003

Species	Band	recap	foreign	total
American Goldfinch	39	12	0	51
American Redstart	63	9	0	72
American Robin	46	5	0	51
American Woodcock	2	0	0	2
American Tree Sparrow	50	0	0	50
Bank Swallow	1	0	0	1
Baltimore Oriole	10	2	0	12
Barn Swallow	3	0	0	3
Black-and-White Warbler	13	7	0	20
Bay-breasted Warbler	6	3	0	9
Black-capped Chickadee	36	62	0	98
Brown-headed Cowbird	4	5	0	9
Blue-headed Vireo	11	1	0	12
Blackburnian Warbler	4	0	0	4
Blue Jay	123	2	0	125
Blackpoll Warbler	61	1	0	62
Brown Creeper	140	18	0	158
Brown Thrasher	13	3	0	16
Black-throated Blue Warbler	42	7	0	49
Black-throated Green Warbler	24	2	0	26
Canada Warbler	10	0	0	10
Cedar Waxwing	19	2	0	21
Chipping Sparrow	2	0	0	2
Cape May Warbler	5	0	0	5
Common Grackle	4	0	1	5
Cooper's Hawk	1	0	0	1
Connecticut Warbler	1	0	0	1
Common Yellowthroat	58	7	0	65
Chestnut-sided Warbler	29	5	0	34
Downy Woodpecker	3	1	0	4
Eastern Kingbird	6	0	0	6
Eastern Phoebe	29	2	0	31
Eastern Towhee	3	0	0	3
Eastern Wood-Pewee	9	1	0	10
European Starling	24	0	0	24
Eastern White-crowned Sparrow	40	7	0	47
Field Sparrow	6	0	0	6
Fox Sparrow	18	3	0	21
Great Crested Flycatcher	4	0	0	4
Golden-crowned Kinglet	526	183	0	709
Gray-cheeked Thrush	52	2	0	54
Gray Catbird	85	39	0	124
Gambel's White-crowned Sparrow	2	0	0	2
Hermit Thrush	200	52	1	253
House Wren	3	0	0	3
Indigo Bunting	3	0	0	3
Least Flycatcher	57	1	0	58
Lincoln's Sparrow	43	1	0	44
Magnolia Warbler	124	22	0	146
Marsh Wren	1	0	0	1
Mourning Warbler	7	0	0	7
Myrtle Warbler	166	7	0	173

Nashville Warbler	130	8	0	138
Northern Cardinal	11	5	0	16
Northern Parula	3	0	0	3
Northern Waterthrush	24	0	0	24
Northern Rough-wing. Swallow	4	0	0	4
Northern Shrike	1	0	0	1
Northern Saw-whet Owl	1	0	0	1
Orange-crowned Warbler	18	2	0	20
Ovenbird	29	2	0	31
Philadelphia Vireo	6	0	0	6
Purple Finch	2	0	0	2
Rose-breasted Grosbeak	5	0	0	5
Red-breasted Nuthatch	2	0	0	2
Ruby-crowned Kinglet	420	111	0	531
Red-eyed Vireo	19	0	0	19
Red-winged Blackbird	25	2	0	27
Savannah Sparrow	2	0	0	2
Slate-colored Junco	132	4	0	136
Scarlet Tanager	2	0	0	2
Song Sparrow	81	19	0	100
Sharp-shinned Hawk	15	1	1	17
Swamp Sparrow	29	0	0	29
Swainson's Thrush	179	19	0	198
Tennessee Warbler	17	0	0	17
Tree Swallow	6	0	0	6
Traill's Flycatcher	54	2	0	56
Veery	30	8	0	38
Warbling Vireo	22	8	0	30
White-crowned Sparrow	2	0	0	2
Wilson's Warbler	48	9	0	57
Winter Wren	52	4	0	56
Wood Thrush	2	0	0	2
Western Palm Warbler	50	5	0	55
White-throated Sparrow	441	39	0	480
Yellow-bellied Flycatcher	15	0	0	15
Yellow-bellied Sapsucker	6	0	0	6
Yellow-shafted Flicker	16	2	0	18
Yellow Warbler	71	59	0	130
Total	**4203**	**783**	**3**	**4989**

Appendix G. Monthly Fat Scores, Fall 2003



Appendix H. Monthly Totals, Spring and Fall 2003

Species	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
AMGO	0	0	0	0	34	3	0	1	1	0	0	0	39
AMRE	0	0	0	0	21	4	0	14	20	4	0	0	63
AMRO	0	0	0	0	8	0	0	27	6	4	1	0	46
AMWO	0	0	0	0	0	0	0	1	1	0	0	0	2
ATSP	0	0	0	0	0	0	0	0	0	14	36	0	50
BANS	0	0	0	0	0	1	0	0	0	0	0	0	1
BAOR	0	0	0	0	3	3	0	4	0	0	0	0	10
BARS	0	0	0	0	3	0	0	0	0	0	0	0	3
BAWW	0	0	0	0	4	0	0	6	1	2	0	0	13
BBWA	0	0	0	0	2	0	0	0	4	0	0	0	6
BCCH	0	0	0	0	2	0	0	7	3	18	6	0	36
BHCO	0	0	0	0	4	0	0	0	0	0	0	0	4
BHVI	0	0	0	0	0	0	0	0	6	5	0	0	11
BLBW	0	0	0	0	3	0	0	1	0	0	0	0	4
BLJA	0	0	0	0	0	0	0	0	103	20	0	0	123
BLPW	0	0	0	0	4	4	0	5	48	0	0	0	61
BRCR	0	0	0	0	0	0	0	0	9	124	7	0	140
BRTH	0	0	0	0	8	2	0	0	2	1	0	0	13
BTBW	0	0	0	0	11	0	0	2	20	9	0	0	42
BTNW	0	0	0	0	4	0	0	0	16	4	0	0	24
CAWA	0	0	0	0	5	0	0	4	1	0	0	0	10
CEDW	0	0	0	0	0	0	0	7	12	0	0	0	19
CHSP	0	0	0	0	2	0	0	0	0	0	0	0	2
CMWA	0	0	0	0	0	0	0	1	3	1	0	0	5
COGR	0	0	0	0	4	0	0	0	0	0	0	0	4
COHA	0	0	0	0	0	0	0	0	0	1	0	0	1
CONW	0	0	0	0	0	0	0	0	1	0	0	0	1
COYE	0	0	0	0	36	5	0	3	11	3	0	0	58
CSWA	0	0	0	0	8	0	0	12	9	0	0	0	29
DOWO	0	0	0	0	0	0	0	0	0	3	0	0	3
EAKI	0	0	0	0	2	2	0	2	0	0	0	0	6
EAPH	0	0	0	0	2	0	0	0	8	18	1	0	29
EATO	0	0	0	0	1	0	0	0	0	2	0	0	3
EAWP	0	0	0	0	3	1	0	1	3	1	0	0	9
EUST	0	0	0	0	3	8	0	13	0	0	0	0	24
EWCS	0	0	0	0	21	0	0	0	1	18	0	0	40
FISP	0	0	0	0	1	0	0	0	0	5	0	0	6
FOSP	0	0	0	0	0	0	0	0	0	18	0	0	18
GCFL	0	0	0	0	1	0	0	3	0	0	0	0	4
GCKI	0	0	0	0	0	0	0	0	2	482	42	0	526
GCTH	0	0	0	0	22	7	0	0	19	4	0	0	52
GRCA	0	0	0	0	41	2	0	25	11	6	0	0	85
GWCS	0	0	0	0	0	0	0	0	0	2	0	0	2
HETH	0	0	0	0	14	0	0	0	8	171	7	0	200
HOWR	0	0	0	0	2	0	0	0	1	0	0	0	3
INBU	0	0	0	0	3	0	0	0	0	0	0	0	3
LEFL	0	0	0	0	33	3	0	11	10	0	0	0	57
LISP	0	0	0	0	27	0	0	0	4	12	0	0	43
MAWA	0	0	0	0	42	6	0	13	55	8	0	0	124
MAWR	0	0	0	0	0	0	0	0	0	1	0	0	1
MOWA	0	0	0	0	6	0	0	0	1	0	0	0	7
MYWA	0	0	0	0	28	1	0	0	17	120	0	0	166

NAWA	0	0	0	0	18	0	0	5	72	35	0	0	130
NOCA	0	0	0	0	3	0	0	2	0	5	1	0	11
NOPA	0	0	0	0	0	0	0	0	3	0	0	0	3
NOWA	0	0	0	0	7	0	0	11	6	0	0	0	24
NRWS	0	0	0	0	4	0	0	0	0	0	0	0	4
NSHR	0	0	0	0	0	0	0	0	0	1	0	0	1
NSWO	0	0	0	0	0	0	0	0	0	1	0	0	1
OCWA	0	0	0	0	1	0	0	0	3	14	0	0	18
OVEN	0	0	0	0	10	3	0	2	7	7	0	0	29
PHVI	0	0	0	0	1	1	0	0	4	0	0	0	6
PUFI	0	0	0	0	0	0	0	0	2	0	0	0	2
RBGR	0	0	0	0	3	0	0	0	2	0	0	0	5
RBNU	0	0	0	0	0	0	0	0	0	2	0	0	2
RCKI	0	0	0	0	21	0	0	0	16	372	11	0	420
REVI	0	0	0	0	4	2	0	1	11	1	0	0	19
RWBL	0	0	0	0	23	0	0	2	0	0	0	0	25
SAVS	0	0	0	0	1	0	0	0	0	1	0	0	2
SCJU	0	0	0	0	0	0	0	0	3	120	9	0	132
SCTA	0	0	0	0	2	0	0	0	0	0	0	0	2
SOSP	0	0	0	0	16	1	0	24	2	37	1	0	81
SSHA	0	0	0	0	0	0	0	2	4	9	0	0	15
SWSP	0	0	0	0	4	0	0	0	3	22	0	0	29
SWTH	0	0	0	0	67	19	0	5	79	9	0	0	179
TEWA	0	0	0	0	1	0	0	5	10	1	0	0	17
TRES	0	0	0	0	6	0	0	0	0	0	0	0	6
TRFL	0	0	0	0	11	11	0	22	10	0	0	0	54
VEER	0	0	0	0	8	1	0	5	16	0	0	0	30
WAVI	0	0	0	0	6	2	0	11	3	0	0	0	22
WCSP	0	0	0	0	0	0	0	0	0	2	0	0	2
WIWA	0	0	0	0	14	5	0	8	20	1	0	0	48
WIWR	0	0	0	0	0	0	0	0	11	38	3	0	52
WOTH	0	0	0	0	1	0	0	0	1	0	0	0	2
WPWA	0	0	0	0	19	0	0	0	18	13	0	0	50
WTSP	0	0	0	0	46	1	0	0	55	336	3	0	441
YBFL	0	0	0	0	3	1	0	6	5	0	0	0	15
YBSA	0	0	0	0	0	0	0	0	1	5	0	0	6
YSFL	0	0	0	0	2	0	0	2	9	3	0	0	16
YWAR	0	0	0	0	44	7	0	18	2	0	0	0	71
Sp.	**0**	**0**	**0**	**0**	**65**	**27**	**0**	**39**	**61**	**53**	**13**	**0**	**90**
Total	**0**	**0**	**0**	**0**	**764**	**106**	**0**	**294**	**795**	**2116**	**127**	**0**	**4203**

Appendix I. Daily Totals, Fall 2003

Date	Banded	Recap	Cap.	Census	DT	NSB	NSR	Obs	DST	Tot Species
13-Aug-03	29	5	2	184	210	0	0	0	210	27
16-Aug-03	30	2	0	195	226	0	0	2	228	33
17-Aug-03	30	4	0	166	197	0	0	1	198	29
18-Aug-03	37	4	0	218	254	0	0	0	254	39
19-Aug-03	5	4	0	0	9	0	0	0	9	9
20-Aug-03	11	3	0	187	201	0	0	0	201	28
21-Aug-03	0	2	0	637	639	0	0	0	639	27
22-Aug-03	8	3	0	0	11	0	0	0	11	7
23-Aug-03	37	2	2	429	469	0	0	0	469	33
24-Aug-03	11	3	0	556	567	0	0	0	567	35
25-Aug-03	11	6	0	254	266	0	0	0	266	29
26-Aug-03	9	3	1	207	217	0	0	0	218	33
27-Aug-03	5	0	0	411	416	0	0	0	416	28
28-Aug-03	19	2	0	127	144	0	0	0	144	36
29-Aug-03	16	5	0	100	121	0	0	11	132	49
30-Aug-03	22	5	0	178	200	0	0	0	200	43
31-Aug-03	13	6	0	206	221	0	0	0	221	40
01-Sep-03	14	4	1	141	158	0	0	91	238	42
02-Sep-03	17	4	6	280	304	0	0	31	334	47
03-Sep-03	11	4	1	190	204	0	0	59	251	35
04-Sep-03	6	2	2	86	96	0	0	46	135	41
05-Sep-03	45	2	1	175	223	0	0	0	223	40
06-Sep-03	27	3	2	159	191	0	0	3	194	43
07-Sep-03	26	4	1	220	250	0	0	0	250	33
08-Sep-03	24	5	0	165	194	0	0	45	236	39
09-Sep-03	18	7	0	209	232	0	0	0	232	30
10-Sep-03	18	4	0	155	177	0	0	0	177	28
11-Sep-03	20	1	2	78	99	0	0	0	99	36
12-Sep-03	11	1	1	38	51	0	0	0	51	26
13-Sep-03	11	1	1	97	108	0	0	17	123	29
14-Sep-03	4	3	0	90	95	0	0	0	95	23
15-Sep-03	5	2	0	233	238	0	0	29	264	27
16-Sep-03	31	0	2	681	709	0	0	1224	1902	40
17-Sep-03	13	0	1	155	169	0	0	237	406	39
18-Sep-03	27	0	2	153	181	0	0	88	262	32
20-Sep-03	80	1	0	289	364	0	0	144	462	35
21-Sep-03	45	3	0	134	174	0	0	76	242	43
22-Sep-03	18	2	0	77	97	0	0	0	97	28
23-Sep-03	13	1	0	246	254	0	0	0	254	22
24-Sep-03	28	1	0	381	407	0	0	27	434	37
25-Sep-03	8	4	0	171	183	0	0	18	201	30
26-Sep-03	62	2	0	107	170	0	0	142	299	52
28-Sep-03	57	5	0	112	167	0	0	109	267	47
29-Sep-03	107	9	7	200	309	0	0	95	378	52
30-Sep-03	50	4	1	259	309	0	0	71	371	47
01-Oct-03	41	1	0	142	181	0	0	68	239	45
02-Oct-03	15	2	1	163	177	0	0	64	235	29
03-Oct-03	103	2	0	145	245	0	0	86	309	37
04-Oct-03	91	24	0	94	184	0	0	102	265	37
05-Oct-03	58	15	0	306	367	0	0	49	408	37
06-Oct-03	245	8	24	417	696	0	0	228	873	50
07-Oct-03	108	22	0	389	517	0	0	46	563	43

08-Oct-03	66	24	2	354	434	0	0	0	434	37
09-Oct-03	75	16	0	333	412	0	0	213	593	49
10-Oct-03	111	7	2	137	243	0	0	114	330	36
11-Oct-03	174	5	0	234	358	0	0	178	463	35
12-Oct-03	32	15	1	212	254	0	0	71	314	35
13-Oct-03	66	7	0	308	369	0	0	0	369	29
14-Oct-03	31	6	0	150	183	0	0	120	287	31
16-Oct-03	46	7	2	183	232	0	0	69	280	30
17-Oct-03	54	13	1	118	180	0	0	66	236	35
18-Oct-03	139	15	0	135	274	0	0	202	421	38
19-Oct-03	78	41	1	103	222	0	0	128	336	31
20-Oct-03	194	40	1	480	636	0	0	212	803	39
21-Oct-03	101	66	0	179	337	0	0	103	418	28
22-Oct-03	110	38	75	217	400	0	0	232	588	37
23-Oct-03	64	32	3	263	356	0	0	113	454	36
24-Oct-03	16	15	1	242	268	0	0	71	317	33
25-Oct-03	4	5	0	75	83	0	0	104	184	37
26-Oct-03	0	0	0	288	288	0	0	0	288	21
27-Oct-03	28	11	0	348	384	5	0	87	468	39
28-Oct-03	24	9	0	684	707	0	0	91	777	37
29-Oct-03	3	10	0	405	417	0	0	115	527	27
30-Oct-03	25	6	1	251	282	0	0	47	326	36
31-Oct-03	7	4	0	754	764	0	0	216	944	30
01-Nov-03	42	7	0	557	605	0	0	74	671	35
03-Nov-03	0	0	0	570	570	0	0	0	570	24
05-Nov-03	57	3	1	1294	1349	0	0	80	1415	33
06-Nov-03	26	4	0	2178	2203	0	0	557	2745	37
07-Nov-03	3	5	0	965	973	0	0	60	1031	29
08-Nov-03	0	0	0	1981	1981	0	0	20	2001	30
09-Nov-03	0	0	0	1824	1824	0	0	0	1824	18
10-Nov-03	0	0	0	4818	4818	0	0	0	4818	21

Appendix J. Banding Totals for Mugg's Island and Tommy Thompson Park

Species	Fall 1999	Fall 2000	Fall 2003 TTP	Spring 2000	Spring 2001	Spring 2002	Spring 2003 TTP
American Goldfinch		2	2	9		15	37
American Redstart	15	24	38	37	1	30	25
American Robin	1	27	38	7	2	8	8
American Tree Sparrow		1	50	2	1		
American Woodcock			2				
Baltimore Oriole	1	2	4	4		3	6
Bank Swallow							1
Barn Swallow							3
Bay-breasted Warbler	4	1	4	2		4	2
Bicknell's/Gray-ch. Thrush	1						
Black-and-white Warbler	9	9	9	4	2	10	4
Black-billed Cuckoo	2	1				2	
Blackburnian Warbler		2	1				3
Black-capped Chickadee	14	7	33	1	7	10	2
Blackpoll Warbler	1	3	53			8	8
Black-throated Blue Warbler	28	16	31	29	2		11
Black-throated Green Warbler	3	3	20	2		3	4
Blue Jay	20	1	123		1	1	
Blue-gray Gnatcatcher		4				5	
Blue-headed Vireo	1	6	11	3	2	3	
Blue-winged Warbler		1				2	
Brown Creeper	7	9	140	26	3	11	
Brown Thrasher	1	3	3	2		2	10
Brown-headed Cowbird				3		6	4
Canada Warbler	8	9	5	10	3	9	5
Cape May Warbler			5				
Carolina Wren	2	1				1	
Cedar Waxwing	4	14	19	2	5	1	
Chestnut-sided Warbler	3	9	21	21	1	24	8
Chipping Sparrow		1					2
Common Grackle		2				1	4
Common Yellowthroat	11	9	17	27	6	73	41
Connecticut Warbler		1	1				
Cooper's Hawk			1				
Downy Woodpecker	2	1	3	2	1		
Eastern Kingbird		1	2			2	4
Eastern Phoebe	3	12	27	5	1	4	2
Eastern Towhee			2			1	1
Eastern White-crowned Sparrow			19				21
Eastern Wood-Pewee	2	2	5	1		3	4
European Starling		8	13				11

Field Sparrow	2		5			5	1
Fox Sparrow	1		18	4	2	1	
Gambel's White-crown. Sparrow			2				
Golden-crowned Kinglet	38	143	526	48	47	5	
Golden-winged Warbler				1			
Gray Catbird	9	13	42	29	1	49	43
Gray-cheeked Thrush	21	9	23	9	6	8	29
Gray-cheeked/Bicknell's Thrush		1					
Great-crested Flycatcher	4	2	3	4		2	1
Hairy Woodpecker						1	
Hermit Thrush	34	117	186	116	43	80	14
House Finch		4					
House Wren		2	1	13		8	2
Indigo Bunting		1					3
Least Flycatcher	6	14	21	21	2	16	36
Lincoln's Sparrow	5	6	16	6	4	22	27
Magnolia Warbler	59	67	76	87	14	83	48
Marsh Wren			1				
Mourning Warbler	3		1	1		7	6
Myrtle Warbler	5	7	137	5	13	26	29
Nashville Warbler	27	64	112	12	14	23	18
Northern Cardinal	6	4	8	3	2	1	3
Northern Flicker	3	2	14	1	6		2
Northern Parula	1		3	1		1	
Northern Rough-wing. Swallow							4
Northern Saw-whet Owl			1				
Northern Shrike			1				
Northern Waterthrush	3	2	17	7	1	4	7
Olive-sided Flycatcher	1			1			
Orange-crowned Warbler	6	7	17	1		3	1
Ovenbird	15	16	16	21	5	14	13
Philadelphia Vireo		1	4	1		3	2
Purple Finch	2		2				
Red-breasted Nuthatch			2		2	1	
Red-eyed Vireo	13	10	13	11	6	11	6
Red-winged Blackbird			2			2	23
Rose-breasted Grosbeak	2	1	2	1	1	2	3
Ruby-crowned Kinglet	73	88	399	72	20	76	21
Rufous-sided Towhee				2			
Savannah Sparrow			1				1
Scarlet Tanager	3			1		3	2
Sharp-shinned Hawk	2	1	15		2	1	
Slate-coloured Junco	4	25	132	30	2	4	
Song Sparrow	1	15	64	26	6	8	17
Swainson's Thrush	34	32	93	76	33	43	86
Swamp Sparrow	2	12	25	16	2	27	4

Tennessee Warbler	1	1	16	2	1	1	1
Traill's Flycatcher	3	9	32	10	1	20	22
Tree Swallow							6
Veery	15	3	21	11	2	16	9
Warbling Vireo	2	7	14			6	8
Western Palm Warbler	3	2	31	2		7	19
White-crowned Sparrow		4	2	5	6	5	
White-eyed Vireo	1						
White-throated Sparrow	74	77	394	230	46	317	47
Wilson's Warbler	10	15	29	14	1	21	19
Winter Wren	5	8	52	11	2	10	
Wood Thrush	1		1	3	1	5	1
Yellow Warbler		12	20	12		50	51
Yellow-bellied Flycatcher	7	4	11	12		13	4
Yellow-bellied Sapsucker		2	6			1	
Yellow-billed Cuckoo		1					
Grand Total	650	1003	3332	1138	332	1254	870

Appendix K. Summary Of Fall Records By Species (161 Species)

Species	Number of Dates	Peak Number	Date	First Record	Last Record
ABDU	22	12	22-Oct	26-Aug	11-Nov
AGWT	15	14	8-Nov	8-Sep	8-Nov
AMCO	4	1	several	25-Oct	1-Nov
AMCR	11	9	10-Nov	11-Sep	10-Nov
AMGO	73	23	31-Oct	13-Aug	10-Nov
AMKE	8	9	2-Oct	17-Sep	30-Oct
AMPI	43	119	31-Oct	6-Sep	10-Nov
AMRE	33	5	1-Sep	18-Aug	10-Oct
AMRO	63	22	13-Aug	13-Aug	10-Nov
AMWI	3	9	1-Oct	15-Sep	29-Oct
AMWO	16	1	several	24-Aug	25-Oct
ATSP	14	22	1-Nov	18-Oct	9-Nov
BANS	4	6	18-Aug	18-Aug	28-Aug
BAOR	13		several	13-Aug	12-Sep
BARS	18	62	26-Aug	13-Aug	15-Sep
BAWW	13	2	several	20-Aug	19-Oct
BBPL	1	1	11-Oct		
BBWA	8	2	several	1-Sep	30-Sep
BCCH	82	22	5-Nov	13-Aug	10-Nov
BCNH	21	16	24-Aug	16-Aug	1-Nov
BEKI	30	2	Several	27-Aug	25-Oct
BGGN	6	2	2 Dates	16-Aug	6-Sep
BHCO	3	1	Several	16-Aug	8-Oct
BHVI	9	2	Several	8-Sep	10-Oct
BLBW	4	3	2-Sep	18-Aug	2-Sep
BLJA	34	530	16-Sep	12-Sep	26-Oct
BLPW	21	55	20-Sep	23-Aug	2-Oct
BOBO	2	1	16-Sep	16-Sep	27-Oct
BOGU	1	1	25-Oct		
BRCR	38	24	10-Oct	11-Sep	8-Nov
BRTH	5	1	Several	16-Aug	11-Oct
BTBW	30	5	5-Oct	23-Aug	16-Oct
BTNW	18	7	29-Sep	30-Aug	18-Oct
BUFF	16	205	10-Nov	17-Oct	10-Nov
BWTE	3	5	22-Sep	21-Aug	22-Sep
BWWA	1	1	29-Aug		
CAGO	66	76	21-Aug	13-Aug	8-Nov
CATE	16	3	26-Aug	18-Aug	21-Sep
CAWA	6	2	31-Aug	18-Aug	5-Sep
CEDW	49	55	2-Sep	13-Aug	6-Nov
CHSP	3	1	Several	21-Sep	10-Oct
CHSW	5	11	21-Aug	21-Aug	29-Aug
CMWA	7	1		29-Aug	16-Oct
COGO	7	10	8-Nov	28-Oct	10-Nov
COGR	22	75	28-Oct	13-Aug	28-Oct
COHA	10	1	Several	16-Aug	30-Oct

COLO	11	1		4-Sep	8-Nov
CONW	1	1	7-Sep		
CORE	2	2	8-Nov	6-Nov	8-Nov
COSN	2	1	13-Aug	13-Aug	18-Sep
COTE	17	7	21-Aug	13-Aug	13-Sep
COYE	29	4	3-Sep	20-Aug	17-Oct
CSWA	17	3	Several	18-Aug	21-Sep
DCCO	53	396	21-Aug	13-Aug	6-Nov
DOWO	12	2	5-Nov	24-Aug	7-Nov
DUNL	2	5	8-Nov	7-Nov	8-Nov
EAKI	7	2	20-Aug	13-Aug	2-Sep
EAPH	29	4	Several	24-Sep	1-Nov
EATO	3	4	12-Oct	10-Oct	12-Oct
EAWP	11	2	7-Sep	28-Aug	3-Oct
EUST	74	45	5-Oct	13-Aug	9-Nov
EVGR	1	1	6-Oct		
FISP	7	5	20-Oct	21-Aug	22-Oct
FOSP	16	5	23-Oct	3-Oct	10-Nov
GADW	37	17	23-Oct	17-Aug	8-Nov
GBBG	16	4	2 Dates	24-Aug	8-Nov
GBHE	21	2	Several	13-Aug	2-Oct
GCFL	9	2	29-Aug	13-Aug	6-Sep
GCKI	37	150	6-Oct	30-Sep	8-Nov
GCTH	12	3	Several	9-Sep	4-Oct
GHOW	1	1	27-Oct		
GRCA	55	11	2 Dates	13-Aug	24-Oct
GREG	3	2	30-Aug	30-Aug	5-Sep
GRSC	2	1	23-Sep	23-Sep	6-Nov
GRYE	13	2	2 Dates	29-Aug	7-Nov
HAWO	6	2	6-Sep	22-Oct	31-Oct
HERG	55	17	26-Aug	18-Aug	10-Nov
HETH	40	44	7-Oct	7-Sep	10-Nov
HOFI	10	10	24-Aug	13-Aug	31-Oct
HOGR	1	1	4-Sep		
HOME	15	25	9-Nov	14-Sep	10-Nov
HOWR	4	2	2 Dates	21-Sep	26-Sep
INBU	1	1	26-Sep		
KILL	19	6	29-Sep	16-Aug	14-Oct
LALO	2	1		9-Oct	6-Nov
LEFL	21	3	18-Aug	13-Aug	22-Sep
LESA	1	4	24-Aug		
LESC	2	80	10-Nov	31-Oct	10-Nov
LEYE	1	1	6-Sep		
LISP	12	5	10-Oct	18-Sep	27-Oct
MALL	77	136	27-Aug	13-Aug	10-Nov
MAWA	40	8	9-Sep	18-Aug	11-Oct
MAWR	1	1	27-Oct		
MERL	1	1	17-Oct		
MODO	11	2	25-Aug	17-Aug	6-Nov
MOWA	2	1	2 Dates	2-Sep	3-Sep

MUSW	49	71	30-Sep	21-Aug	10-Nov
MYWA	42	65	6-Oct	20-Sep	6-Nov
NAWA	35	24	29-Sep	23-Aug	16-Oct
NOCA	64	4		13-Aug	10-Nov
NOGO	6	2	25-Oct	14-Oct	8-Nov
NOHA	14	4	1-Oct	17-Aug	17-Oct
NOPA	4	1	Several	2-Sep	26-Sep
NOPI	2	1	2 Dates	8-Sep	20-Oct
NOWA	20	4	5-Sep	13-Aug	20-Sep
NRWS	1	2	28-Aug		
NSHO	4	5	20-Oct	18-Sep	23-Oct
NSHR	1	1	30-Oct		
NSWO	1	1	20-Oct		
OCWA	12	4	3-Oct	26-Sep	21-Oct
OLDS	18	4400	10-Nov	22-Oct	10-Nov
OSFL	1	1	25-Sep		
OSPR	2	1	2 Dates	3-Sep	17-Sep
OVEN	14	3	5-Oct	17-Aug	9-Oct
PEFA	4	1	Several	28-Aug	19-Oct
PESA	1	6	14-Oct		
PHVI	6	1		29-Aug	29-Sep
PISI	8	1	Several	6-Oct	6-Nov
PIWA	1	1	20-Sep		
PUFI	29	3	12-Oct	16-Aug	6-Nov
PUMA	2	3	2 Dates	1-Sep	3-Sep
RBGR	4	2	24-Sep	8-Sep	24-Sep
RBGU	77	159	6-Oct	13-Aug	10-Nov
RBME	4	10	3-Nov	25-Oct	10-Nov
RBNU	24	4	6-Oct	18-Aug	5-Nov
RBWO	2	1	2 Dates	28-Sep	1-Oct
RCKI	41	110	20-Oct	5-Sep	7-Nov
REDH	2	2	23-Oct	23-Oct	8-Nov
REKN	1	1	29-Aug		
REVI	17	3	2 Dates	28-Aug	5-Oct
RODO	1	1	4-Sep		
RTHA	3	1	Several	16-Sep	7-Nov
RTHU	11	6	2-Sep	26-Aug	17-Sep
RUBL	12	42	12-Oct	1-Oct	9-Nov
RWBL	26	150	28-Oct	13-Aug	10-Nov
SAVS	1	1	13-Oct		
SCJU	36	60	20-Oct	24-Sep	8-Nov
SNBU	4	1		30-Oct	8-Nov
SOSP	71	13	17-Aug	13-Aug	10-Nov
SPSA	14	1	Several	20-Aug	15-Sep
SSHA	35	4	6-Oct	25-Aug	24-Oct
SWSP	16	3	2 Dates	10-Sep	29-Oct
SWTH	38	11	16-Sep	16-Aug	24-Oct
TEWA	10	5	30-Sep	23-Aug	5-Oct
TRES	3	6	21-Aug	21-Aug	30-Sep
TRFL	24	6	16-Aug	13-Aug	30-Sep

VEER	19	4	2-Sep	18-Aug	29-Sep
WAVI	18	8	18-Aug	13-Aug	29-Sep
WBNU	4	2	2 Dates	1-Oct	28-Oct
WCSP	17	8	11-Oct	26-Sep	3-Nov
WIWA	25	5	7-Sep	18-Aug	10-Oct
WIWR	36	21	11-Oct	21-Sep	7-Nov
WODU	1	3	14-Sep		
WOTH	1	1	28-Sep		
WPWA	19	15	20-Sep	5-Sep	12-Oct
WTSP	47	160	11-Oct	9-Sep	8-Nov
WWSC	1	4	1-Nov		
YBFL	9	3	18-Aug	16-Aug	20-Sep
YBSA	10	5	2 Dates	26-Sep	7-Oct
YSFL	63	8	2 Date s	16-Aug	1-Nov
YWAR	15	13	16-Aug	13-Aug	3-Sep