

MIGRATION MONITORING AT TTPBRS: Spring and Fall 2007



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Cover-Common Redpoll (Seabrooke Leckie/TTPBRS), Pg.2-Aerial View of TTP (TRCA), Pg.10-Yellow-throated Warbler (Seabrooke Leckie/TTPBRS), Pg.18-Stilt Sandpiper (Seabrooke Leckie/TTPBRS), Pg.22-Redpolls (Seabrooke Leckie/TTPBRS), Pg.22-Purple Martins (Ian Sturdee/TTPBRS), Pg.23-Monarchs (Seabrooke Leckie/TTPBRS), Pg.23-Winged Migration Students (TRCA)

Executive Summary

In 2003, Toronto and Region Conservation (TRCA) established a bird research station at Tommy Thompson Park. The core program of the research is Migration Monitoring, a scheme dedicated to gathering population trends on northern breeding landbirds that are not monitored effectively by other schemes (e.g. Breeding Bird Survey). Net closure on November 12, 2007 marked the completion of the fifth consecutive year of the Migration Monitoring Program at Tommy Thompson Park Bird Research Station. Data collection in spring and fall 2007 was consistent with methodology outlined in the Operations Manual for Tommy Thompson Park Bird Research Station (Derbyshire 2004).

Coverage in spring 2007 was good as 67 of 70 target days received at least some coverage. This was an improvement over the coverage level set in 2006 when only 64 days received coverage. In terms of net hours, 4,595 hours were logged which is 73% of the target, the lowest spring netting coverage since TTPBRS began. Weather is responsible for the lost hours as high winds and low temperatures limited net operation on many days. During spring 2007, 2,638 birds were banded, 369 recaptured and an additional 107 birds were released unbanded. The total birds banded in 2007 is a new spring TTPBRS record, while the 369 birds recaptured is an all-time low. A total of 178 species were recorded for the season. Banding statistics indicate that the first week of April was busier period of migration than normal, which boosted results for several early spring migrants. The final three weeks of the spring were unusually slow based on data from previous years. A total of four new species for TTPBRS were encountered during the season, which included Yellow-throated Warbler and American Avocet.

Coverage in fall 2007 was above average as 96 of 100 target days received at least some coverage. In terms of net hours, 6,835 hours were logged which is 76% of the target (100days x 90hrs/day), up from 69% in 2006. The increase in coverage did not mean an increase in season banding total as 3391 birds were banded, which is the 2nd lowest fall total since TTPBRS began in 2003. The season also posted record low results for total recaptures, total captured unbanded and rate of birds captured/mist net hour. Analysis of captures by month indicate that all months in fall 2007 featured lower than normal capture rates. Based on age ratio calculations, a summer of low breeding success in the north is likely involved in the reduced density of migrants during the fall migration. However, fall 2007 will be remembered as the season of migration spectacles thanks to some impressive movements of Northern Saw-whet Owls, winter finches, Purple Martins and Monarchs.

The research station at Tommy Thompson Park continues to engage the community through educational programming. A total of 1744 visitors to Tommy Thompson Park were welcomed at TTPBRS in 2007. The 2007 field season was important to the long-term development of TTPBRS through the record high support from volunteers and increased outreach to the community. Fundraising in 2007 was improved from previous years due to increased support from donors and fundraiser participants, and also the launch of the TTPBRS Membership Program. During spring and fall 2007, TTPBRS participated in a groundbreaking research project by the Canadian Migration Monitoring Network to determine breeding origins of target species. Close to 1000 feather samples were submitted to the CMMN and we will continue to support this important initiative in the future.

Introduction

In April of 2003, Toronto and Region Conservation Authority (TRCA) established a research station at Tommy Thompson Park (TTP). The primary objectives of the research station are to aid conservation efforts at the local, national and international level through monitoring, research and education. The core program of the Tommy Thompson Park Bird Research Station (TTPBRS) is the Migration Monitoring Program. This report details results of the Spring and Fall seasons at TTPBRS.

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) began construction of a landbase at the foot of Leslie Street in the late 1950's to expand port facilities in anticipation of increased shipping activity on the Great Lakes.

From the late 1950's until present day, a combination of lakefilling and dredging activities created the current configuration of the park. Tommy Thompson Park 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.

Through natural succession much of the land area of TTP has been colonized by a variety of plant and animal communities. The geographic situation of the park and its natural features make it very suitable for large numbers of breeding and migrating birds. 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 2000.

The site selected for Migration Monitoring is located on peninsula D, which is one of several peninsulas that branch off the main spine of the spit. The peninsula is bordered by the Toronto harbour on the north side and an inner bay on the south side. The habitat is composed of early succession cottonwood, willow and birch forest. Beach and meadow features are also present in the study area.

Toronto and Region Conservation (TRCA)

Toronto and Region Conservation (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 watersheds, sound environmental 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 and conservation education and heritage programs.

Objectives of the Living City Campaign (run by TRCA) 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 this Living City vision.

Rationale

Migration Monitoring Overview

The Breeding Bird Survey (BBS) is the principal method used by conservation organizations to monitor bird populations. This method is effective only where breeding populations are accessible to roadside surveying. The remoteness of much of northern Canada precludes such survey methods. It is therefore necessary to monitor these populations on their southward and northward migrations.

Methods

Protocol

The protocol for data collection at TTPBRS is detailed in the Operations Manual for Tommy Thompson Park Bird Research Station (Derbyshire 2004). The protocol employs fixed effort census and point count surveys as well as a fully standardized capture regimen. Spring migration monitoring operates on a daily basis from April 1-June 9. Fall Migration Monitoring operates in the same manner from August 5-November 12.

Spring Migration Monitoring Results

Synopsis

April

The 5th year of the Migration Monitoring Program at Tommy Thompson Park began on April 2nd. The first week of fieldwork in 2007 was unusual given the unprecedented number of cancellations due to weather and also the remarkable number of birds passing through.

The first field day of 2007 began with westerly winds and high counts of Brown Creeper and Slate-colored Junco. TTPBRS was also buzzing with American Robins, Red-winged Blackbirds and the ubiquitous Song Sparrows of early spring. On the water, Common Mergansers and White-winged Scoters were particularly abundant and remained so throughout the first week. A total of 50 birds were banded on the 1st day and 47 species were recorded overall. Clear and calm conditions on the 3rd were more comfortable and a decent variety of birds were found. Several spring arrivals were recorded including Red-necked and Horned Grebe, Glaucous Gull and **American Bittern**. Seabrooke Leckie had the most unusual sighting of the day, a male **European Goldfinch** in full song near net 3 (almost certainly an escaped domestic)!

Steady rain was encountered for the first few hours of April 4th. The nets went up when the rain ended and an impressive early spring movement was recorded. Observations of Yellow-bellied Sapsucker and Hermit Thrush added some variety to the 109 birds of just 4 species banded in 3 hours of operation! Conservative estimates of Slate-colored Junco (240), Brown Creeper (160) and Golden-crowned Kinglet (190) established new record high spring counts for all three species at TTPBRS.

Unfortunately, the nets were closed for the remainder of the week due to cold temperatures. Census was conducted daily, which documented higher than normal concentrations of landbirds at TTPBRS. Highlights of the surveys include a Pied-billed Grebe on April 5 and a Brown Thrasher on April 6.

The weather experienced during the first two weeks of spring 2007 was remarkably windy, wet and cold, which adversely affects birds trying to migrate north. Banding was cancelled from April 8-9 due to negative temperatures. Surveys during the two-day period revealed high numbers of waterbirds, particularly Long-tailed Duck, Bufflehead and White-winged Scoter. A half-day of banding on April 10 yielded only 8 new birds, including the season's first White-throated Sparrow. Another abbreviated session on April 11 produced 14 birds banded and a suite of spring arrivals including Iceland Gull, Northern Shoveler, and Cooper's Hawk. Kinglets, robins, blackbirds and flickers were the primary landbirds evident on the day. Full coverage resumed on the 14th when 23 birds were banded and season firsts of Greater Yellowlegs, Caspian Tern and Great Egret were observed. A

single **Black Scoter** was also detected amongst the lingering rafts of White-winged Scoter.

The third week of April began with high winds, cold temperatures and very few migrants. With the persistent inclement weather we began to envision an immense "bottleneck" of birds to the south that would suddenly break with a shift in weather. There was no shift in the weather on the 16th and 17th and just 8 birds were banded during the two days. A near complete day of coverage on the 18th produced 10 birds banded and 12 recaptures as well as first of spring sightings of Ruddy Duck, Trumpeter Swan and Green-winged Teal. The temperatures improved on the 19th, however the wind was still from the north. Highlights of the day included observations of Merlin, Rusty Blackbird, Great Black-backed Gull and the first of many Common Terns to arrive at Tommy Thompson Park. Migration picked up on the 20th when 27 birds were banded, mainly Golden-crowned Kinglets, Hermit Thrushes and Slate-colored Juncos. The first Barn Swallows and Savannah Sparrows of the year were observed. Finally, south winds and warm temperatures returned on the 21st and a small surge of migrants was recorded. A total of 55 birds were banded on the day, which included Myrtle Warbler and Ruby-crowned Kinglet. Unusual observations included an Eastern Meadowlark and the first ever **Short-eared Owl** recorded at TTPBRS!

The final week of April was a great week of fieldwork as weather during the period was less turbulent than in previous weeks. Warm and calm conditions on the 22nd were appropriate for migrating birds as 91 birds were banded on the day. Season firsts of Northern Rough-winged Swallow and Chipping Sparrow were observed along with high counts of creepers, kinglets and juncos. Volunteers of the Fatal Light Awareness Program (FLAP) visited TTPBRS and received some great hands on training for their important rescue work in the city. Highlights of the following morning were first-of-spring sightings of both Pine and Palm Warblers and a sharp increase in numbers of Ruby-crowned Kinglet and White-throated Sparrow. The calm and clear weather continued through the 24th when 57 birds were banded of 15 species including a Black-and-white Warbler. Migrant activity was lacking on the 25th as just 15 birds were banded on the day although the sighting of a **Northern Mockingbird** was unusual for TTPBRS. Overnight on April 27, passing rain showers met with migrating birds along the north shore of Lake Ontario, which caused a "fallout" event. A total of 127 birds were banded on the following morning, predominantly White-throated Sparrows and Myrtle Warblers. The first Blue-headed Vireo and Nashville Warbler of the spring were also recorded. Clouds rolled in on the 28th and there were fewer birds evident, however there were still lots of birds to show-and-tell to enthusiastic groups from the Toronto Ornithological Club and Royal Ontario Museum. The highlight of April 29 was the first appearance of Northern Waterthrush and high numbers of Myrtle Warblers. Migrants were grounded overnight by passing showers, which led to several new arrivals on the 30th including American Pipit, Wood Thrush, Great Crested Flycatcher and our earliest spring record of Bobolink. While many birds were around that morning, the winds were rolling out of the north at >70kph, which made it very difficult to find them!

May

The first day of May was a quiet affair as just 16 birds were banded, although Cliff Swallow, Ruddy Duck and Spotted Sandpiper were observed. We eagerly anticipated the arrival of some new warbler species on the 2nd, however the study area was distinctly more "April-like" with kinglets and Hermit Thrushes dominating. A total of 40 birds were banded on May 3, which included a Northern Waterthrush and the first Veery of the spring. Calm conditions overnight set the stage for a busier morning on May 4. It felt a little more like May on this morning with sightings of Rose-breasted Grosbeak, Least Flycatcher, Ovenbird and several Yellow Warblers. The day belonged to the White-throated Sparrows as 82 were banded and over 180 tallied. Baltimore Oriole, Gray Catbird and Swainson's Thrush added some diversity to the mobs of White-throats on May 5.

The second week of May began with just a few drops of warblers and other neotropical migrants and ended with a flood! North winds on the 6th reduced bird numbers at TTPBRS, although there were still plenty of birds for our second training day of the season with FLAP volunteers. High numbers of Ruby-crowned Kinglet, Hermit Thrush and a late Brown Creeper indicated that things were a little behind schedule. Overnight conditions were calm, which enabled a large volume of birds to pass over. The result was a very quiet morning on May 7 as just 15 birds were banded. A few 'new' warblers did choose to drop down on the lakeshore including Black-throated Green, Magnolia, Blackburnian, **Hooded** and our first ever **Prothonotary Warbler**! Tommy Thompson Park was 'flown over' again on May 8 as relatively few birds were evident despite heavy traffic on NEXRAD doppler radar overnight. Migrant activity picked up a little on May 9 when 59 birds were banded including 4 Wood Thrush, 3 Gray Catbird and 5 Lincoln's Sparrow. Overnight rain on May 10 caused a significant grounding of migrants, resulting in 149 birds banded and 18 warbler species recorded, including our 2nd **Hooded Warbler** of the spring.

White-throated Sparrow, Least Flycatcher, Swamp Sparrow and Ovenbird were particularly abundant in the count area that morning. May 11 was a memorable day as a total of 95 species were recorded in 6 hours at TTPBRS, a new one-day record! A total of 184 birds were banded and 12 new arrivals were noted, including **White-eyed Vireo**, Scarlet Tanager, Indigo Bunting, **Golden-winged Warbler**, Black-billed Cuckoo and a stunning male **Yellow-throated Warbler**! An impressive 25 warbler species were observed during the morning. May 12 was the Spring Bird Festival at Tommy Thompson Park and over 150 participants were in attendance. There was lots of activity remaining from the previous day providing great opportunities for the public to view birds in-the-hand at TTPBRS!

A total of 34 birds were banded on the 13th along with 16 recaptures. The indisputable highlight of the day was the second ever record of **Red-bellied Woodpecker** for the station! Myrtle Warbler and Ruby-crowned Kinglet were the most common species captured, which, given the date, is a good indication that migration had stalled. On May 14 we banded our first **Mourning Dove** in 5 years of operations at TTPBRS. Also noted on the day were a sprinkling of flycatchers, warblers and thrushes. On May 15, Mourning Warbler and Ruby-throated Hummingbird made first appearances for the spring, and overall migrant activity was a little higher as 54 birds were banded with just 5 recaptures. Dominant species on the day were Swainson's Thrush and Magnolia Warbler. Numbers of warblers increased on the 16th as 20 species were noted including 16 Cape May Warblers. Migration really slowed down on May 18 when just 12 birds were banded from 90 mistnet hours! Migrants were more numerous on May 19 when 90 birds were banded including 24 Magnolia Warblers and 6 Veery. A **Green Heron** flushed from the slough was just the 4th record of the species for TTPBRS. The Garden Show with Mark Cullen (CFRB 1010) went live from TTPBRS at 10am on the 19th! The show highlighted the work of the research station and promoted the Baillie Birdathon.

Calm nights occurred throughout the third week of May, which resulted in a steady passage of migrants over Toronto. While most of the birds passed through overnight, we were pleased to find good numbers of shorebirds, warblers and thrushes. May 20 was quiet at TTPBRS as just 6 birds were banded on the day. First of spring observations of Ruddy Turnstone and Philadelphia Vireo were highlights of the 21st. More migrant activity was evident on the 22nd as 61 birds were banded, which mostly consisted of Swainson's Thrush, Veery and Magnolia Warbler. Highlights of the day were first sightings of Whimbrel and **Common Nighthawk** for the spring and the first record of **American Avocet** for TTPBRS! The last group of students of the *Winged Migration* program came through on this day, closing a month of daily demonstrations at the station. On May 23 it was apparent that the season was shifting as late spring species began arriving including Yellow-bellied Flycatcher and Blackpoll Warbler. Common Yellowthroat and American Redstart were the most abundant warbler species on the day. A record high count of 170 Whimbrel was also made as groups of 20-30 birds passed by Tommy Thompson Park between 7 and 9am. A total of 58 birds were banded on the following day, which included 8 Traill's Flycatcher and 6 Gray-cheeked Thrush. Calm conditions persisted into the 25th of May, which allowed most nocturnal migrants to pass over Toronto. However, some opted to drop down, as 58 birds were banded. The usually elusive **Connecticut Warbler** was observed for the first time in spring since 2004. Red-eyed Vireo and Swainson's Thrush continued to build in numbers on the 26th. The birch-poplar canopy was relatively quiet as most of the activity was at ground level with thrushes, Common Yellowthroats, Canada Warblers and a boisterous **Connecticut Warbler**, likely a different individual than the previous morning.

Following the hustle and bustle of mid-May, migration began winding down during the last week of the month. The flycatchers, vireos and thrushes of late spring were less abundant than in years past, perhaps owing to ideal conditions for nocturnal passage. On May 26, the explosive song of our third **Connecticut Warbler** of the spring was heard. Swainson's Thrush was the most common migrant recorded, followed by a smattering of flycatchers and warblers. Showers dampened the dry foliage at TTPBRS on May 27, when the 2nd station record of Orchard Oriole was spotted. Numbers of migrants picked up on the 28th as 61 birds were banded, and a late surge of Magnolia, Blackburnian and Black-throated Green Warblers was noted. The National Post visited the station for a feature story on this day. Marisol Ayala, a Masters student in the Environmental Studies Program at York University, spent the morning filming our work on the 29th. The secretive Gray-cheeked Thrushes were well sampled by the nets that morning as 14 were banded.

June

South winds and high temperatures continued on June 1, with 32 birds banded, including the season's first Yellow-billed Cuckoo. Several Ruby-throated Hummingbirds, a total of 5 Mourning Warblers, and a very late Ruby-crowned Kinglet were standouts on an otherwise quiet June 2. The final week of the season was a quiet

one as migration appeared come to an abrupt end this year. Just 44 birds were banded during the week, a total that consisted of mostly Gray-cheeked Thrushes and Gray Catbirds. The banding of two **Hermit Thrushes** during the week was highly unusual given the late date (Hermit Thrush is an early spring migrant). Also late was a Western Palm Warbler banded on June 7. This bird was 16 days later than the previous record late individual on May 22, 2006.

Overview of Spring Coverage and Results

Coverage in spring 2007 was very good as 67 of 70 target days received at least some coverage. This is an improvement over the coverage level set in 2006 when only 64 days received coverage. After each field day at TTPBRS, a coverage code is assigned based on completeness of all surveys. The optimal coverage code of 7 indicates that there were 90 total net hours, a completed census and 3 completed point counts. This spring, 40 days were coded with a 7 compared to 37 days in 2006 and 50 in 2005. In terms of net hours, 4,595 hours were logged which is 73% of the target, the lowest spring netting coverage since TTPBRS began. Weather is responsible for the lost hours as high winds and low temperatures limited net operation on many days.

During spring 2007, 2,638 birds were banded, 369 recaptured and an additional 107 birds were released unbanded. The total birds banded in 2007 is a new spring TTPBRS record, while the 369 birds recaptured is an all-time low (previous low of 468 in 2005). A total of 178 species were recorded for the season. Refer to Table 1 for a summary of spring 2007 coverage and results compared to previous years.

Table 1. Spring Coverage Statistics and Results Summary

Unit	2007	2006	2005	2004
Days with at least some coverage	67	64	67	69
Days with full coverage (Code 7)	40	37	50	37
Total Species Detected	178	179	173	161
Birds Banded	2638	2570	2547	2519
Birds Recaptured	369	470	468	604
Captured Unbanded	107	54	78	236
Total Captures	3114	3094	3093	3359
Net Hours	4595	4687	5492	5317
New birds banded/net hour	.57	.54	.46	.47

Banding Summary and Discussion

This past season was only our fourth “complete” season of spring migration monitoring because 2003 was a pilot year with coverage not beginning until early May. Spring 2007 featured the highest banding total and capture rate (new birds banded/net hour) than any previous spring season. The total number of birds banded in any given season is not particularly relevant as a means of measuring the quality of our efforts. What is important is that our efforts are consistent and that our sampling methods are rigorous.

Looking at all four seasons of spring migration monitoring, individual season banding totals have gradually increased from year-to-year. This isn't reflected in the effort as mistnetting coverage has decreased since 2004. These results are more likely reflective of changes in vital rates of migratory species in recent years or changes in local landscape conditions. The weeks of April 1-7 and May 6-12 were highest in terms of capture rate for the whole season. The high abundance of migrants recorded for the week of April 1-7 is quite unusual considering previous spring reports, which discussed low migrant density for the month of April in all years. Full weekly capture statistics are listed in Table 2.

Table 2. Spring Weekly Capture Statistics

Week	Banded 2004	Rate	Banded 2005	Rate	Banded 2006	Rate	Banded 2007	Rate
April 1-7	42	0.09	252	0.65	71	0.24	193	0.88
April 8-14	67	0.12	283	0.47	199	0.48	45	0.24
April 15-21	161	0.3	138	0.23	200	0.34	114	0.28
April 22-28	153	0.28	71	0.21	167	0.46	390	0.66
April 29-May 5	249	0.49	133	0.25	487	0.78	348	0.65
May 6-12	663	1.15	418	0.66	332	0.67	584	0.96
May 13-19	265	0.44	410	0.65	244	0.51	317	0.56
May 20-26	575	1.03	281	0.46	347	0.97	314	0.54
May 27-June 2	267	0.52	446	0.75	409	0.69	290	0.50
June 3-8	77	0.14	115	0.19	114	0.23	43	0.13
April 1-June 8	2519	0.47	2547	0.46	2570	0.54	2638	0.57

A comparison of spring 2007 weekly capture rates versus the 2004-2006 average is represented in Figure 1. The high capture rate during the first week of 2007 deviates sharply from the norm while the final few weeks of the season were atypically low. It is evident here that the first two weeks of May in 2007 were unusually high in terms of migrant abundance. The pattern for the 2004-2006 average is interesting as two distinct peaks are evident for the weeks of May 6-12 and May 20-26. The low capture rate recorded after May 6-12 in 2007 could be indicative of weather conditions that limited grounding of migrants or could be related to low populations of late spring migrant species.

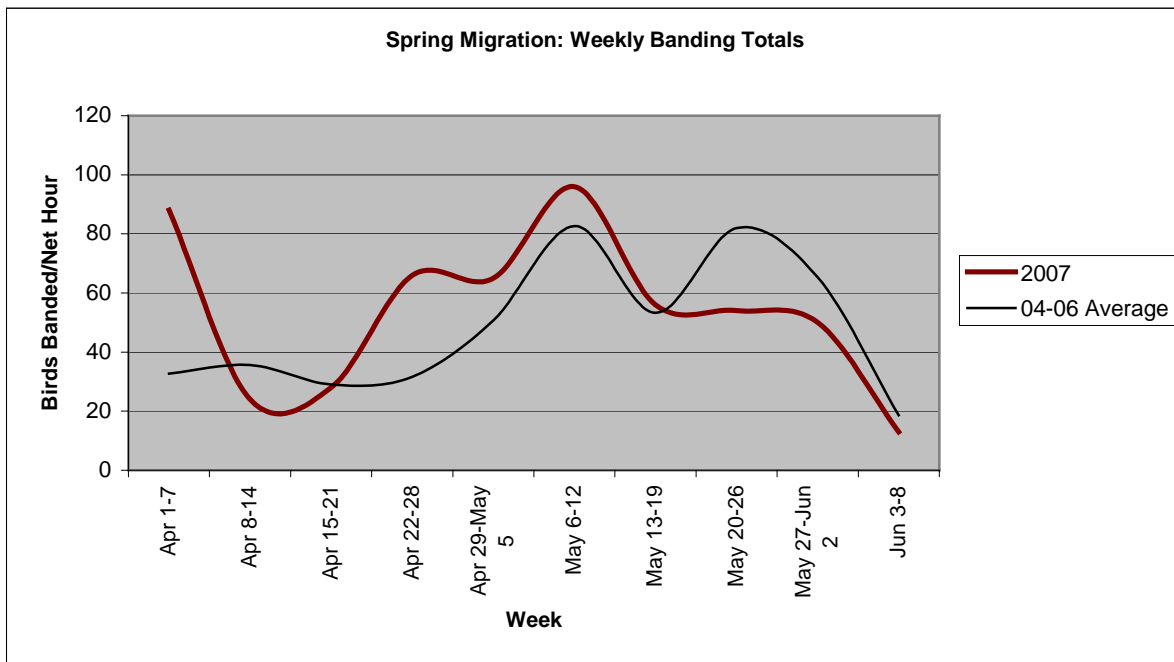


Figure 1. Spring Migration: Weekly Banding Totals

Banding totals by species for 2007 compared to the 2004-2006 average are presented in Appendix A. Mourning Dove and Yellow-throated Warbler were banded for the first time in spring 2007. Sharp-shinned Hawks are relatively common captures during fall migration, however the first spring individual was finally captured this year. Results indicate that spring 2007 was a strong season for early spring migrants such as Slate-colored Junco, Brown Creeper and Myrtle Warbler. It was a record low year for many late spring migrant species such as Philadelphia Vireo, Traill's Flycatcher and American Redstart to name a few. The annual practice of ranking species by banding totals (Table 3) reveals that White-throated Sparrow remained the most commonly captured species in spring, closely followed by Myrtle Warbler, Swainson's Thrush and Magnolia Warbler. For the first time, Gray-cheeked Thrush appears in the top ten list and has been increasing in abundance gradually since 2004.

Table 3. Spring 2007: Top Ten Species Banded, 2004-2007

2007 Rank	Species	2007 Banded	2006 Rank	2005 rank	2004 rank
1	White-throated Sparrow	395	1	2	1
2	Myrtle Warbler	208	2	4	2
3	Swainson's Thrush	127	3	3	5
4	Magnolia Warbler	120	9	5	3
5	Slate-colored Junco	118	14	10	20
6	Ruby-crowned Kinglet	107	6	12	12
7	Golden-crowned Kinglet	106	5	1	29
8	Hermit Thrush	105	4	6	10
9	Brown Creeper	102	8	7	34
10	Gray-cheeked Thrush	74	16	22	30

In spring 2007, species with marked increases are mainly April migrants. Species with marked decreases are much more common, the most notable of which are Winter Wren and Eastern Wood-Pewee.

Table 4. Selected species showing marked decrease/increase in 2007

Increase					Decrease				
Species	2007	2006	2005	2004	Species	2007	2006	2005	2004
White-throated Sparrow	395	363	206	264	Golden-crowned Kinglet	106	116	281	27
Myrtle Warbler	208	165	145	210	Traill's Flycatcher	42	54	43	115
Slate-colored Junco	118	54	67	47	American Redstart	34	47	48	50
Ruby-crowned Kinglet	107	103	59	61	Red-eyed Vireo	10	14	3	60
Brown Creeper	102	85	84	23	Winter Wren	7	18	20	20
Gray-cheeked Thrush	74	50	42	27	Common Grackle	4	13	23	6
Ovenbird	51	27	49	28	Field Sparrow	1	6	12	3
					Philadelphia Vireo		2	3	14
					Eastern Wood-Pewee		5	4	5

Recaptures

A total of 369 birds were recaptured this spring, which is the lowest season total of recaptures since TTPBRS began. In previous reports, recaptures were treated as a sum of all records. By breaking the recaptures into repeats and returns it becomes clear that fewer individuals are involved. Of 369 total recaptures in spring 2007, 59 are individuals returning from a previous year. These returns account for 95 of the 369 total recaptures (includes 36 multiple encounters). The remaining recaptures are repeats (banded and recaptured in same season) and a single foreign encounter. A total of 214 individuals were recaptured after initial banding in spring 2007. These individuals were encountered at least once, while an additional 59 recaptures are multiples of these individuals. These recapture results present a great deal of opportunity to assess repeat and return rates and probabilities, which would greatly enhance our understanding of landbird stopover and survivorship at the site. This will be done at a later date when five complete years of data are available. A breakdown of recapture statistics is provided in Table 5.

Table 5. Spring 2007 Recapture Totals

spcd	Repeat Individuals	Rep. Multiples	Return Individuals	Ret. Multiples	Foreign	Grand Total
AMGO	8	1	5			14
AMRE	3					3
AMRO	2	1	4			7
BAOR	4		6	1		11
BAWW	6	3				9
BCCH	1	3	5	2		11
BHCO	2	1	4	1		8
BLPW	1					1
BRCR	6	3				9
BRTH	2					2
BTBW	1					1
CAWA	2					2
COYE	6	2				8
CSWA	2					2
DOWO	2		1			3
EWCS	1					1
FOSP	1					1
GCKI	13	10				23
GCTH	3					3
GRCA	9	5	3	6		23
HETH	17	4				21
LISP	2					2
MAWA	12	3				15
MYWA	5					5
NAWA	6					6
NOCA	2		1			3
NOWA	1					1
OVEN	9	2				11
RCKI	12	2				14
RWBL	3	2				5
SCJU	2					2
SOSP	12	2	4	1		19
SWSP	10	6				16
SWTH	1					1
TRES			2			2
TRFL	2					2
VEER	4	1				5
WAVI	2		4	1		7
WIWA	3					3
WIWR					1	1
WPWA	6					6
WTSP	19	2				21
YSFL	1					1
YWAR	8	6	20	24		58
Grand Total	214	59	59	36	1	369



Unusual Sightings

Spring 2007 was a great season for unusual sightings. A total of four species were new for the research station. The Yellow-throated Warbler banded on May 11 was a first for Tommy Thompson Park/Leslie Street Spit.

- American Avocet-** (1st TTPBRS record) A single flyover on May 22
- American Coot-** Two birds on Apr 24
- American Bittern-** A single individual on April 3
- Black Scoter-** One bird on April 14
- Cliff Swallow-** Unusual for TTPBRS, singles were observed on May 1 and 2
- Common Nighthawk-** A rare visitor to TTP. Single recorded on May 22
- Connecticut Warbler-** Record season for this species. Singing males on May 25, 26 and 29
- Eastern Bluebird-** One individual on May 9
- European Goldfinch-** Singing male on April 3, deemed an escapee
- Forster's Tern-** Single on April 24 (second consecutive spring with sighting)
- Glaucous Gull-** Two birds on April 3 and one on April 6
- Green Heron-** One on May 19
- Grasshopper Sparrow-** (2nd TTPBRS record) Single on May 11
- Golden-winged Warbler-** Single on May 11
- Hooded Warbler-** First on May 7 and second on May 10
- Iceland Gull-** Just one bird on April 11
- Orchard Oriole-** (2nd TTPBRS record) A singing male on May 27
- Prothonotary Warbler-** (1st TTPBRS record) Single on May 7 near TTPBRS (not in count area)
- Red-bellied Woodpecker-** 1 noisy individual on May 13
- Red-necked Grebe-** 10 individuals from April 3-May 2
- Short-eared Owl-** (1st TTPBRS record) Single flyover on April 21
- White-eyed Vireo-** (2nd TTPBRS record) Single on May 11
- Yellow-billed Cuckoo-** Just one individual on June 1
- Yellow-throated Warbler-** (1st TTPBRS record) Single captured and banded on May 11

Personnel

A total of 24 volunteers contributed 1,690 hours to the spring migration monitoring program at TTPBRS! Many of these volunteers put in extra hours toward data management and fundraisers. Thanks are due to all of our volunteers for their help this past spring!

Table 6. Volunteer Effort

Name	Hours	Name	Hours
Don Johnston	251	Attila Fust	41
Ian Sturdee	237	Steve Gillis	35
Andrew Jano	223	Andrew McDonald	26
Seabrooke Leckie	204	Norma Vanderzon	24
Bert Vanderzon	105	Mitch Meredith	18
Teresa Carlin	77	Dave Langford	16
Julia Marko Dunn	72	Kerry McGuire	14
Chris Dunn	95	Joanna Jack	11
Larry Menard	62	Trish Clark	7
Jan McDonald	53	Rob Maciver	7
Tom Flinn	51	Neil Goodenough	7
Pierre Robillard	49	Natasha Visosky	7
			1690

Fall Migration Monitoring Program Results

Synopsis

August

After a summer of breeding bird studies, the Tommy Thompson Park Bird Research Station began the Fall Migration Monitoring Program on August 5. The Cedar Waxwing was the most numerous species at the site during the hot and humid first week of coverage. Large flocks of both adult and young waxwings were found wheeling around the study area in search of the remaining honeysuckle and dogwood fruit. While the banding may have been slow during the week, the variety of species present was high. Eastern Kingbirds, Yellow Warblers, Baltimore Orioles and Barn Swallows were active on August 6. A very early **Philadelphia Vireo**, several Purple Martins and 40 Yellow Warblers were observed on August 7. Temperatures were very high on August 8, which forced us to close down a bit early and likely limited bird movement during the morning. A return to full coverage on August 10 yielded just 12 birds banded, however an impressive 10 species were added to the growing season species total. Silver-haired Bats were also common, fortunately only one was found in the nets! Bird activity picked up on the 11th as 33 birds were banded, which included Northern Waterthrush and Mourning Warbler.

Weather was hot with variable winds from the south on August 12 when 15 birds were banded. Dominant migrant species on the day were Cedar Waxwing, Traill's Flycatcher and Yellow Warbler. Winds then switched to north for the 13th, but were likely too strong to encourage large numbers of birds to move. Five new arrivals for the fall were recorded including Pied-billed Grebe, Bay-breasted Warbler and the 5th banding record of **Yellow-billed Cuckoo** for TTPBRS. Conditions were suitable for an influx of migrants on the 14th, however just 15 birds were banded in six hours of effort. The weather must have been responsible for the arrival of seven new species for the fall, which included a record early **Hermit Thrush**. A full day of fieldwork on the 16th produced 18 new birds banded, the highest one-day banding total of the week! Highlight of the morning was an early Blackpoll Warbler. Numbers of Monarch Butterflies increased substantially on the 17th and the seasons' first Ovenbird and Northern Mockingbird were recorded.

Light north winds on August 19 resulted in 40 birds being banded of 17 species. Increased numbers of warblers and shorebirds were documented along with higher counts of roosting Monarch Butterflies. A number of new arrivals for the fall were encountered on August 20, including Green-winged Teal, Merlin, Northern Harrier and

Trumpeter Swan. Strong winds kept the nets furled on August 21, which gave us an opportunity to count over 1000 Monarch Butterflies in the study area. A bit later in the morning, an awesome 1,215 **Purple Martins** were observed off Pipit Point, and it was amazing to see these birds forging through massive wind and waves as they disappeared over a turbulent Lake Ontario. A return to full coverage on the 22nd was productive as 45 birds were banded of 19 species. A total of 67 Eastern Kingbirds were observed flying over the station on the 24th, which was a record high count for a 24-hour period - until 140 were observed on August 25th! Black-throated Green Warbler and Olive-sided Flycatcher were new arrivals on the 25th, which was a quiet day with just 12 birds captured.

Light northerlies on August 26 resulted in the banding of 31 birds of 15 species. Shorebird numbers were improved on this day as Pectoral Sandpiper and Short-billed Dowitcher were observed on the muddy perimeter of the study area. Increased abundance and diversity of warblers, vireos and thrushes was noted on August 27. The morning included the banding of 2 Cape May Warblers and tallies of 20 Myrtle Warblers, 8 Red-eyed Vireos and 5 Blackburnian Warblers. The birding subsequently slowed down for a few days, reaching a low of just 5 birds captured in 90 net hours on August 30. Ruby-throated Hummingbirds were common during the period, more often caught than seen (4 captured on August 28). A sharp increase in migrant activity was noted on August 31 when 46 birds were banded and over 440 Monarchs were counted during the morning census. The light northerlies brought in hummingbirds (7), a few raptors and good numbers of warblers (22 species) and vireos (35 Red-eyed Vireos). A visit to the lighthouse later in the day revealed over **20,000 Monarch Butterflies**, one of the highest concentrations documented at Tommy Thompson Park! The monarchs roosting in the cottonwoods were not present early the next morning, which suggests that the butterflies may have departed at dawn.

September

September started strong with the busiest day of the season to that point as 80 birds were banded, which included 12 Red-eyed Vireos. Singles of **Common Nighthawk** and **Red-bellied Woodpecker** were observed. Light winds and cool temperatures on September 2 resulted in a moderate passage of migrants at TTPBRS, as 37 birds were banded. South winds moved in on the 3rd and slowed things down, as just 9 birds were captured in 6 hours. The following morning was more active with 44 birds of 18 species banded. Red-eyed Vireo, Veery and warblers were the order of the day as is typical for early September. Rain and high winds moved in on the 5th, canceling banding for the day. Calm conditions on the 6th resulted in another trickle of migrants. Ruby-throated Hummingbirds were abundant that morning. A single American Golden-Plover was a highlight of the 7th, which was otherwise a quiet affair with just 12 birds banded and 7 recaptured.

There was no coverage on the 9th due to weather. The cold front boosted numbers of migrants on the 10th as 91 birds were banded. Several fall firsts were logged amongst the 75 species recorded on the day, including Ruby-crowned Kinglet, Brown Creeper and Slate-colored Junco. A few late flycatchers were also banded. Red-breasted Nuthatches continued to pour through TTPBRS, reaching a high count of 20 on September 10. September 11 was distinctly quieter with just 18 birds banded. West winds moved in on the 12th, which further stifled overall numbers of songbirds. However, the conditions were ideal for a raptor flight and by the end of the day a respectable 71 Sharp-shinned Hawks and 7 Northern Harriers were totaled. Also recorded were lesser numbers of Broad-winged Hawk, Merlin, Turkey Vulture, Bald Eagle and Cooper's Hawk. American Pipits arrived from their breeding grounds in the arctic on the 13th, a day that also featured the arrival of their boreal neighbour, the Gray-cheeked Thrush. At this point the water levels at Tommy Thompson Park were extremely low, which created some great shorebird habitat in the embayments.

The third week of September was dominated by warm temperatures and clear skies, which afforded much opportunity for migrating birds to bypass Toronto on their way south. Small waves of warblers, vireos and thrushes were recorded alongside an increase in numbers of White-throated Sparrows, kinglets and Brown Creepers. A total of 28 birds were banded on September 16, which consisted mainly of Nashville Warblers and Swainson's Thrushes. Forty-two White-throated Sparrows and 3 Slate-colored Juncos were detected. The highlight of the 17th was the first record of **Buff-breasted Sandpiper** for TTPBRS. A full morning of coverage on the 19th yielded very few migrants as just 5 birds were banded on the day. The first **Baird's Sandpiper** for TTPBRS was spotted in embayment D. Calm conditions overnight spurred on the migration, which resulted in 6 new arrivals for the fall and 49 birds banded. The third record of **Yellow-breasted Chat** was a highlight amongst the new arrivals. Numbers of Gray-cheeked, Swainson's and Hermit Thrushes were up and decent numbers of 16 warbler species were documented. The final day of the update period featured a return to strong south

winds, and all was quiet on the bird front. A **White-rumped Sandpiper** was discovered, which put the final touch on a remarkable week for shorebirds; low numbers but very good diversity.

The trickle turned into a torrent during the next week as thrushes, kinglets, sparrows and other "late fall" migrants arrived en masse. Moderate numbers of birds were observed and banded on September 23. The most unusual sighting of the day was a flyover **Dickcissel**, the 3rd record for the station since 2003. Blue Jays were moving through on a daily basis and 343 were recorded on the 23rd. Migration slowed down on the 24th for the start of the *Winged Migration* program. Hermit Thrushes, White-throated Sparrows and Myrtle Warblers were the most conspicuous species on the day. September 25 was much the same with unusually warm temperatures (high of 29.1). Small numbers of Yellow-bellied Sapsucker, Winter Wren and Golden-crowned Kinglet were noted. The 26th was even slower as just 11 birds were banded in 6 hours of effort. The winds switched to the west around late morning, prompting 1100 Blue Jays to quietly wing over TTPBRS. Later that evening, a cold front moved in around midnight during a session of Saw-whet Owl banding and many birds were heard descending from the skies to seek refuge. The 173 birds banded the next morning revealed a significant number of thrushes and Myrtle Warblers. September 28 was also active as 91 birds were banded, including 12 Blue Jays, 5 Black-throated Blue Warblers and a Northern Parula. There was no break in the action on the 29th as substantial numbers of kinglets, creepers, phoebes and White-crowned Sparrows arrived on the Toronto lakeshore. By the end of the morning, a total of 219 birds of 26 species had been banded. Also of note during the day was the observation of 3 Red Bats, which together with the two captured earlier in the week is easily the most we have recorded at TTPBRS in one week.

October

More south winds on October 1st contributed to a quiet day at TTPBRS, with just 20 birds banded. The aquatic habitats were ideal for shorebirds and yet few shorebirds were observed save for good numbers of Killdeer and the odd Black-bellied Plover or American Golden-Plover. A total of 8 birds were captured on October 3, which is unusually slow for October at Tommy Thompson Park. Later that evening, owls were on the move as 34 Northern Saw-whet Owls were captured. Diurnal migration picked up on October 4 as 24 American Pipits were tallied and increased numbers of Eastern Phoebe, Black-capped Chickadee, Golden- and Ruby-crowned Kinglets and White-throated Sparrows were noted. Calm conditions that evening resulted in a substantial movement of birds, with 119 banded on the morning of October 5. The first Field Sparrow and Orange-crowned Warbler of the fall were logged. Ruby-crowned Kinglet, Hermit Thrush, Brown Creeper and White-throated Sparrows were the most abundant passerines detected. Also noteworthy during the morning was the banding of a late Yellow-bellied Flycatcher and high counts of Blue-headed Vireo (12) and Black-capped Chickadee (22).

Autumn seemed to finally arrive at the very end of the second week of October. Right on schedule, massive numbers of songbirds were sampled when the weather was suitable for fieldwork. Conditions on the 8th were very warm (high of 27.4 Celsius) with light southerlies, which likely held birds that arrived on the previous day with the warm front. A total of 112 birds were banded during a morning of thick fog at Tommy Thompson Park. Kinglets, Nashville Warblers and Myrtle Warblers were the most abundant species banded on the day. Our coverage on October 9 was reduced due to high winds and rain. The plaintive calls of Golden-crowned Kinglets and Brown Creepers reached a fevered pitch by late morning as hundreds descended from the poplars and birches. A total of 75 birds were captured in just 2 hours of effort. Strong south winds on October 10 forced us to close nets early. Diversity of waterfowl species was impressive as Northern Pintail, Blue-winged Teal, Northern Shoveler, American Wigeon and Common Goldeneye were spotted. A return to more "normal" weather on October 11 was welcomed as light northerlies and cooler temperatures brought increased numbers of American Robin and Red-breasted Nuthatch along with singles of Orange-crowned Warbler, Dunlin and a late Magnolia Warbler. More bird activity was evident on the following morning as 193 birds were banded and season firsts of Fox Sparrow, Pine Siskin and American Tree Sparrow were detected. Temperatures dipped to a low of 5 Celsius on October 13, with strong winds once again reducing our coverage to just the daily census.

October 14 was the busiest day of the fall season to date as 247 birds were banded during the morning. The light north winds brought scores of kinglets, Myrtle Warblers and Hermit Thrushes. Also captured were 2 Orange-crowned Warblers and a late Tennessee Warbler. Season firsts of Surf Scoter and Ring-necked Duck were amongst 37 species recorded during the census. Conditions were suitable later that night for Northern Saw-whet Owls as 34 were captured, including 16 on one net check. The following morning was also busy, with 197 birds banded and 30 recaptured. The species composition was much the same as the previous day

although more Brown Creepers were evident and singles of Blue-headed Vireo, Chipping Sparrow and Black-throated Green Warbler were banded. Very strong winds led to minimal coverage (census only) on October 16. Conditions stabilized on the 17th and the migration was still in full swing. A total of 136 birds were banded and 33 recaptured. A flock of 20 **Brant** (1st for TTPBRS) briefly settled near the large sandbar that had formed off the beach. Five White-winged Scoter and singles of late **Yellow-bellied** and **Least Flycatchers** were also notable. A season high of 65 Black-capped Chickadees was reached on this day, which is the highest one-day total since the last southern irruption in fall 2005. Thereafter, coverage was reduced as the weather became problematic, with a dense fog shrouding TTPBRS on the 18th, and strong winds that kept our nets furled for October 19-20.

The third week of October was a blustery seven days of fieldwork at TTPBRS with relatively few migrants passing through. Just 232 birds were banded during the week. Numbers of waterfowl, winter finches and blackbirds increased and numbers of Fox Sparrows and Golden-crowned Kinglets remained record low. High winds curtailed the banding operation on October 21. During the calm first couple of hours after sunrise, a substantial movement of blackbirds, pipits and finches occurred. Light bird activity on the 22nd included a late **Yellow-billed Cuckoo** and a Brown Thrasher. Conditions were suitable for owls later that evening as 21 Northern Saw-whets and a Long-eared Owl were banded. A stiff north wind arrived on the 23rd along with lots of rain. This weather likely led to a busier morning on October 24 as 92 birds were banded of 18 species. Highlights of the morning include the first Bonaparte's Gulls of the fall, good numbers of Hermit Thrushes and singles of Orange-crowned Warbler and Field Sparrow. Sparrows were more numerous on the 25th as banding totals included 3 Fox Sparrow, 10 Slate-colored Junco, 3 White-throated Sparrow, and 7 American Tree Sparrow. Long-tailed Ducks and Bufflehead suddenly appeared in large numbers on the 26th, which is one of the first indicators that the fall migration is nearing an end. Landbirds flying over the station were plentiful as mixed flocks of blackbirds and smaller groups of finches, Snow Buntings and American Pipits were recorded in large numbers. **Common Redpolls** were being recorded on a daily basis and in decent numbers, which is significant given that the species had not been recorded since the fall of 2004. It was even more of a surprise to find one in our nets on October 28 as, much like Pine Siskins, they rarely land in the study area.

November

A couple of rattling Lapland Longspurs flew over on November 3, which brought the season species total to a record high 184. The final week of the season was much like the previous week with very few birds captured (39) but some heavy overhead movement of winter finches, blackbirds, Snow Buntings, American Pipits and Horned Larks. Northern Saw-whet Owls continued to move through the park during the week with over 50 owls banded. November 10 was cold and overcast with light north winds. These conditions were ideal for a large passage of finches on the Toronto lakeshore. A total of 67 Common Redpolls were recorded along with smaller numbers of Pine Siskin and a brief sighting of an Evening Grosbeak. This was just the second record of **Evening Grosbeak** for TTPBRS and easily a record high count for Common Redpoll.

Overview of Fall Coverage and Results

Coverage in fall 2007 was above average as 96 of 100 target days received at least some coverage. After each field day, a coverage code is assigned based on completeness of all surveys. The optimal coverage code of 7 indicates that there were 90 total net hours, complete census and 3 completed point counts. This fall 50 days were coded with a 7, which is the best result since 2004. In terms of net hours, 6,835 hours were logged which is 76% of the target (100days x 90hrs/day), up from 69% in 2006.

The increase in coverage did not mean an increase in season banding total as 3391 birds were banded, which is the 2nd lowest fall total since TTPBRS began in 2003. Fall 2003 didn't begin until mid-August, receiving 10 fewer days of coverage. Therefore, 2007 was the slowest fall season we have ever had at TTPBRS. The season also posted record low results for total recaptures, total captured unbanded and rate of birds captured/mist net hour. Despite this, a record high 185 species were recorded, which may be a function of increased effort toward casual observations. As has been mentioned in previous reports, annual shifts in populations are normal and expected. What is important is that the data was collected with skill and precision and in accordance with the operations manual.

Furthermore, fall 2007 will be remembered as the season of migration spectacles thanks to the impressive movements of Northern Saw-whet Owls, winter finches, Purple Martins and Monarchs.

Table 7. Coverage Statistics and Results Summary

Unit	2007	2006	2005	2004	2003
Days with at least a census	96	87	91	95	84
Days with full coverage (Code 7)	50	40	48	60	0
Net Hours	6835	6085	6816	7388	6726
Total Species Detected	185	176	180	173	161
Birds Banded	3391	4473	4247	3870	3327
Birds Recaptured	423	429	560	614	623
Captured Unbanded	125	515	382	429	152
Total Captures	3939	5419	5189	4913	4102
Birds banded/net hour	0.50	0.74	0.62	0.52	0.49
Birds captured/net hour	0.58	0.89	0.76	0.66	0.61

Banding Summary and Discussion

Fall 2007 was the fifth consecutive fall season of coverage and the lowest in terms of migrant abundance. Banding totals for 13 species and forms were record low. This list of species includes Golden-crowned Kinglet, which were eclipsed by banding totals of Ruby-crowned Kinglets for the first time. This fall wasn't all lows as five species were banded in record high numbers, including Baltimore Oriole, Common Redpoll and Northern Saw-whet Owl. Weather during summer 2007 was extreme for many regions across Ontario, where high temperatures and drought conditions were reported. This weather likely adversely affected breeding productivity for many migratory species. This is supported by the irruptions of winter finches and owls into the south, which was precipitated by a collapse in seed densities in northern forests. Results from the Monitoring Avian Productivity and Survivorship site at Claireville Conservation Area also indicated that vital rates were low. It would be worthwhile to draw comparisons across other migration monitoring stations in Ontario to determine whether TTPBRS results are consistent.

Table 8. Selected Species with Marked Increase in Fall 2007

Species	2003	2004	2005	2006	2007	2007-nsb
Baltimore Oriole	4	19	10	17	29	68
Common Redpoll					1	
Downy Woodpecker	3	7	6	5	8	
Northern Cardinal	8	15	4	8	20	
Scarlet Tanager		1	3	3	3	

Table 9. Selected Species with Marked Decrease in Fall 2007

Species	2003	2004	2005	2006	2007	2007-nsb
American Tree Sparrow	50	19	18	52	13	2
Black-throated Green Warbler	20	35	23	38	13	
Blue-headed Vireo	11	17	21	14	10	
Cape May Warbler	5	3	6	8	3	
Chestnut-sided Warbler	21	20	27	54	19	
Eastern Towhee	2	1	1	4		
Fox Sparrow	17	12	14	23	12	
Golden-crowned Kinglet	525	856	685	723	436	
Gray Catbird	42	37	26	25	23	
Northern Waterthrush	17	22	25	57	16	
Western Palm Warbler	31	15	16	27	13	
Wilson's Warbler	29	29	42	66	29	
Yellow-shafted Flicker	14	15	8	6	5	

Assessing the 2007 banding data by month it is clear that decreases in migrant abundance are consistent for all months of the season. In previous fall seasons it was apparent that results varied from month to month, which

enabled us to point to specific species, families or guilds of species that were either above or below the norm. Monthly statistics in 2007 reflect a more generalized decrease in abundance for all periods of the season.

Table 10. Yearly Comparison of Monthly Banding Totals

Month	2003-2006 Average			2007		
	Banded	Net Hours	Band/Net Hour	Banded	Net Hours	Band/Net Hour
August	600	2079	0.28	476	2070	0.23
September	1328	2213	0.62	1236	2381	0.52
October	1949	1942	1.03	1608	1766	0.91
November	102	519	0.21	72	618	0.12

One of the many values of Migration Monitoring data is the opportunity it affords to index annual breeding productivity for migratory species. By late summer, bird populations across the continent swell to an annual high as juveniles fledge and begin to disperse and migrate. This is one of the explanations for the disproportionately high number of hatch-year birds banded in the fall. Calculating annual ratio of hatch-year birds to adult birds is useful as year-to-year fluctuations provide markers of breeding productivity at the species level. These ratios are only useful if the aging of banded birds is performed accurately and with caution. In 2007 we would expect that productivity indices (hatch-year percentage of total sample) to be record low. This was certainly the case as 80% of birds successfully aged were classed as hatch-year birds (i.e. birds hatched in 2007). The previous low percentage was 83.7% in 2003, which was previously the fall season with the lowest migrant abundance. These figures differ significantly from the 89% figure derived in 2006, the highest fall season ever in terms of abundance. The low hatch-year percentage in 2007 points to a summer of low breeding success across Ontario, the lowest in at least the last five summers.

Table 11. Yearly Comparison of Hatch-Year Percentages by Species

spcd	2007	2006	2005	2004	2003		2007	2006	2005	2004	2003
American Goldfinch	65	67	73	92	50	Least Flycatcher	100	97	97	100	100
American Redstart	81	88	91	88	82	Lincoln's Sparrow	50	100	93	75	100
American Robin	77	83	73	91	90	Magnolia Warbler	80	91	85	89	82
American Tree Sparrow	67	83	50	68	56	Mourning Warbler	100	75	67	86	100
Baltimore Oriole	100	88	80	90	100	Myrtle Warbler	86	91	80	87	91
Bay-breasted Warbler	80	88	71	100	100	Nashville Warbler	74	88	86	93	84
Black-and-White Warbler	90	90	100	82	78	Northern Cardinal	100	75	50	93	88
Blackburnian Warbler	100	95	100	80	100	Northern Parula	100	78	100	100	100
Black-capped Chickadee	88	100	97	100	94	Northern Waterthrush	50	88	72	86	82
Blackpoll Warbler	77	73	64	45	74	Orange-crowned Warbler	80	90	100	100	94
Black-thr. Blue Warbler	76	74	88	84	87	Ovenbird	94	97	79	97	88
Black-thr. Green Warbler	100	92	91	94	85	Philadelphia Vireo	100	79	100	50	75
Blue Jay	86	100	100	100	94	Red-eyed Vireo	87	82	95	97	85
Blue-headed Vireo	80	79	81	100	100	Rose-breasted Grosbeak	33	100	100	100	100
Brown Creeper	90	83	83	76	68	Ruby-crowned Kinglet	84	92	89	88	89
Canada Warbler	100	77	85	83	60	Scarlet Tanager	100	100	33	100	
Cape May Warbler	67	75	100	67	100	Slate-colored Junco	63	86	80	73	74
Cedar Waxwing	50	38	33	54	53	Song Sparrow	79	82	94	91	80
Chestnut-sided Warbler	84	93	89	90	91	Swainson's Thrush	76	81	78	86	72
Common Redpoll	63					Swamp Sparrow	56	78	81	57	72
Common Yellowthroat	78	83	92	82	77	Tennessee Warbler	67	77	72	100	81
Downy Woodpecker	100	100	83	100	100	Trail's Flycatcher	76	82	82	73	100
E. White-crown Sparrow	63	92	60	58	68	Veery	61	73	55	65	52
Eastern Kingbird	75	86	40	80	50	Warbling Vireo	95	97	93	88	93
Eastern Phoebe	65	96	83	94	93	Western Palm Warbler	38	89	100	60	71
Eastern Towhee		100	100	100	50	White-throated Sparrow	84	86	91	85	78
Eastern Wood-Pewee	100	100	100	100	100	Wilson's Warbler	86	91	98	97	90
European Starling	100	91	75	86	100	Winter Wren	91	100	91	98	94
Field Sparrow	67	80	50	0	80	Wood Thrush	100	83	100	100	100
Fox Sparrow	92	100	79	75	89	Yellow Warbler	81	83	79	83	60
Golden-crowned Kinglet	87	94	95	94	91	Yellow-bellied Flycatcher	100	92	100	81	100
Gray Catbird	83	76	85	97	81	Yellow-bellied Sapsucker	100	94	100	100	67
Gray-cheeked Thrush	66	86	80	79	78	Yellow-shafted Flicker	40	100	75	100	86
Great Crested Flycatcher	100	100	100	100	100						
Hermit Thrush	84	89	89	93	87	Total	0.80	89.0	88.7	86.8	83.7

At the species level, Western Palm Warbler is one of many species with record low banding totals in fall 2007. The percentage of the sample that were hatch-year individuals was 38%, which is 22 percentage points less than the previous low of 60% in 2004. Similar results are evident for Yellow-shafted Flicker, a species with atypically low productivity scores from two sites in the Toronto area (Tommy Thompson Park, Claireville Conservation Area).

The relationship of breeding productivity from various regions of Canada to a sample of migrants at TTPBRS is highly complex and it is expected that in at least some cases, the ratios produced from one station will be false. However, the ratios derived at TTPBRS when used in conjunction with data from all CMMN stations in Ontario greatly improves the utility of the indices. The value will increase dramatically with the completion of the CMMN stable isotope project, which will enable analysis to assess annual productivity with far more precision.

Recaptures

There were 423 recaptures in fall 2007, which is the lowest number ever recorded in a fall season at TTPBRS. Of 423 recaptures, 16 recaptures were of 13 individuals banded in a previous season at TTPBRS, also known as a "return." The remainder of the recaptures (407) consists of 313 individuals originally banded this fall. These recaptures are called "repeats". Repeats are purely transient while returns represent breeders and/or residents. The most commonly recaptured transient species at TTPBRS was Ruby-crowned Kinglet followed by Hermit Thrush, Golden-crowned Kinglet and Black-capped Chickadee.

Table 12. Recapture Totals

Species	Repeat Individuals	Rep. Multiples	Return Individuals	Ret. Multiples	Species	Repeat Individuals	Rep. Multiples	Return Individuals	Ret. Multiples
AMGO			1		NOCA	4	1	2	
AMRE	6				OVEN	3			
AMRO	1				PHVI	2			
ATSP			2	1	RBNU	1			
BAOR	2				RCKI	65	11		
BBWA	1				REVI	4	1		
BCCH	25	41	2	1	SCJU	1			
BRCR	15	3			SOSP	8	1	2	1
BTBW	8	1			SWTH	14	2		
CAWA	2				TEWA	1			
CEDW	2				TRFL	2			
COYE	5	2			VEER	6			
CSWA	1				WAVI	5		2	
DOWO	4	6			WIWR	2			
EWCS	2				WTSP	15	2		
FOSP	1				YWAR	5		1	
GCKI	32	4							
GCTH	8	2							
GRCA	6	3	1						
HETH	34	10							
LISP	1								
MAWA	12	2							
MOWA	1								
MYWA	3								
NAWA	3	1			Total	313	93	13	3



Unusual Records

Below are a few of the unusual records at the bird research station this fall. There were four new additions to the ever-growing TTPBRS checklist.

- Brant-** (1st TTPBRS record) A flock of 20 briefly settled on the sandbar on October 17 (IS et.al)
- Green Heron-** Three individuals in total. First on August 26 and then 2 on September 8 (DGD, SNL)
- Surf Scoter-** Two birds on October 14 (DGD)
- Broad-winged Hawk-** (2nd TTPBRS record) A single individual on September 12 (SNL)
- White-rumped Sandpiper-** A single bird discovered on September 22 lingered for a couple of days (DGD)
- Baird's Sandpiper-** (1st TTPBRS record) A single on September 19 and 20 (mobs)
- Buff-breasted Sandpiper-** (1st TTPBRS record) Single on September 17 (AJ et.al)
- Stilt Sandpiper-** (1st TTPBRS record) Several individuals from September 15-18 (PNP et.al)
- Whimbrel-** A single flyby on September 16 (DGD)
- Yellow-billed Cuckoo-** At least 3 birds with the first on August 13 and the last on October 22 (mobs)
- Common Nighthawk-** Single on September 1 (JMD)
- Red-bellied Woodpecker-** First fall record since 2003 on Sept 1 (SNL)
- Olive-sided Flycatcher-** Just one bird on August 25 (mobs)
- Yellow-breasted Chat-** (2nd TTPBRS record) Briefly sighted on September 20 (DGD)
- Dickcissel-** A flyover on September 23 (DGD)
- Lapland Longspur-** 2 flyovers on November 3 were the first since 2003 (TF)
- Evening Grosbeak-** (2nd TTPBRS record) Single flyover on Nov 10 (DGD)
- Common Redpoll-** An incredible season with over 120 birds between October 28 and November 11 (mobs)

Observers

Dan Derbyshire	DGD	Ian Sturdee	IS
Julia Marko Dunn	JMD	Tom Flinn	TF
Seabrooke Leckie	SNL	Paul Prior	PNP
Andrew Jano	AJ	Many Observers	mobs

Personnel

Volunteer support for fall 2007 was exceptional once again as a record-high 2148 hours were contributed to the Fall Migration Monitoring Program by 23 individuals. Thanks to all of the volunteers for their critical support in 2007!

Table 13. Volunteer Effort

Name	Hours	Name	Hours
Seabrooke Leckie	378	Tom Flinn	44.8
Andrew Jano	284	Pierre Robillard	44.8
Ian Sturdee	217	Josh Shook	41
Don Johnston	205	Julia Marko Dunn	39.8
Teresa Carlin	180	Steve Gillis	33
Jan McDonald	123	Attila Fust	27.8
Larry Menard	120	Dave Langford	17.8
Kerry McGuire	118	Mitch Meredith	11
Joanna Jack	81	Chris Dunn	10.5
Bert Vanderzon	65.3	Rob Maciver	6
Zoe Lebrun-Southcott	50	Andrew Macdonald	3.5
Norma Vanderzon	47	Total	2148

Nocturnal Owl Monitoring

Fall 2007 was the fifth consecutive year of the Nocturnal Owl Monitoring program at TTPBRS. The program is designed to gather population trends for Northern Saw-whet Owls. The protocol is designed around a standardized capture regimen that employs nets from fixed locations operated beginning a half hour after sunset and running for 4 hours. The net array consists of both passive mistnets (30mm) already in use for the Migration Monitoring Program as well as a set of three connected owl nets (60mm) in an L shaped configuration. The Northern Saw-whet Owl call is broadcast from a sound box located in the middle of the owl net array. Results from 2003-2006 were variable with a high of 184 total captures in 2003 and an average of 49 owls captured between 2004 and 2006. The fall 2006 report of a year ago mentioned, "populations of these migratory owls are cyclical and the last major southern irruption was 2003, which might mean that fall 2007 will be another big year." The 2007 season was exceptional as record high numbers of owls were sampled at TTPBRS and other Ontario sites. A total of 314 Northern Saw-whets and 1 Long-eared Owl were banded in 2007. An additional 7 owls were recaptured having been banded at other stations in North America.

A summary of the 2007 season is presented in Table 16. Effort in 2007 was much higher than in previous years as volunteers often operated nets well into non-standard hours (beyond first 4.5 after sunset). A total of 30 nights from September 23 to November 10 were sampled in 2007, which encompasses 1824 total net hours. The first owl was captured on September 26, which was record early. The highest capture rate was recorded on the night/morning of October 15-16 when 42.7 owls were captured per 100 net hours. Overall, the 2007 season ranks lower than 2003 in terms of overall rate of capture, which indicates that 2003 was likely a busier season overall.

Table 14. Nocturnal Owl Monitoring Summary

Date	Standard Hours	Non-standard Hours	Tot. Hours	Banded	Banded- Non Standard	Total Banded	Band/100 Hours
Sep 23	24		24			0	0.00
Sep 26	32		32	1		1	3.1
Sep 27	32		32	2	1	3	9.4
Sep 28	24		24	0		0	0.0
Oct 1	32	8	40	5		5	12.5
Oct 3/4	30	75	105	3	30	33	31.4
Oct 4/5	40	10	50	1	1	2	4.0
Oct 5/6	38	20	58	8	4	12	20.7
Oct 6	20		20	2		2	10.0
Oct 8/9	27.5	15	42.5	2	3	5	11.8
Oct 9/10	28	12	40	9	4	13	32.5
Oct 12		30	30		3	3	10.0
Oct 13/14	20	30	50	1	10	11	22.0
Oct 14/15	38.5	77	115.5	12	17	29	25.1
Oct 15/16	30	45	75	2	30	32	42.7
Oct 17	33		33	2		2	6.1
Oct 18					1	1	
Oct 21		30	30		1	1	3.3
Oct 22	33.75		33.75	1		1	3.0
Oct 23/24	42	77	119	6	15	21	17.6
Oct 24	33		33		1	1	3.0
Oct 27		33	33			0	0.0
Oct 28/29	44	82.5	126.5	11	19	30	23.7
Oct 30		18	18		1	1	5.6
Nov 1/2	44	93.5	137.5	2	11	13	9.5
Nov 2/3	18	79	97	6	7	13	13.4
Nov 3/4	40	82.5	122.5	10	20	30	24.5
Nov 4-5	28	79	107	12	20	32	29.9
Nov 7/8	33.75	82.5	116.25	7		7	6.0
Nov 10/11	30	50	80	3	7	10	12.5
2003	549	75.25	624.25	155	29	184	29
2004	457	141	598	25	5	30	5
2005	526	210.6	736.6	57	8	65	8
2006	403	125.6	528.6	44	10	54	10
2007	795.5	1029	1824.5	108	206	314	17

The high density of migrating owls in 2007 gave us an opportunity to fully assess net productivity and migration timing, which will enable us to cement our field procedures going forward. In 2007 a wider array of nets were operated to determine productivity for each net site. As expected, the highest capture rates are evident for the owl nets (L1-L3) located closest to the sound box. Nets 5 and 6 were operated sparingly in previous years and when operated were found to be unproductive despite that these nets are located close to the owl nets. In 2007 these nets appeared to be appropriately positioned as high capture rates were recorded. Nets 10, 11 and 15 were unproductive and will not be operated in the future. Nets V1 and V2 were new nets set up in late October that performed well. Based on results in Table 17, the following ten nets will make up the standard array in future years: 4, 5, 6, 7, 8, V1, V2, L1, L2 and L3.

Table 15. Nocturnal Owl Monitoring Net Productivity in 2007

Net	Owls	Hours	Owls/Hour
04	12	181	0.07
05	22	162	0.14
06	27	161	0.17
07	23	181	0.13
08	20	181	0.11
09	15	124	0.12
10	5	115	0.04
11	1	4.3	0.23
15	2	68	0.03
L1	81	181	0.45
L2	69	181	0.38
L3	44	181	0.24
V1	5	44	0.11
V2	8	44	0.18

The vast majority of effort in previous years of the Nocturnal Owl Monitoring program was restricted to the standardized period (first four hours post sunset). In 2007 we sought to determine peak timing of owl migration during the daily window for migrating owls, which is roughly 7pm-6am (variable with sunset and DST). Specifically, we wondered if owl abundance during the first four hours was consistent with abundance for the remainder of the night/morning. Results in figure 2 indicate that owl movement builds gradually from 7pm and peaks around midnight to 1am. Abundance drops after 1am but is consistently strong throughout sunrise. Capture rate for the non-standard effort was 20 owls per 100 net hours while the rate was 13 owls/100 hours for the standard period. These results suggest that the first four-hour period would derive a representative sample although opening nets 1-2 hours later than is current practice would increase the sample. The procedures will be fully standardized prior to the commencement of the program in 2008.

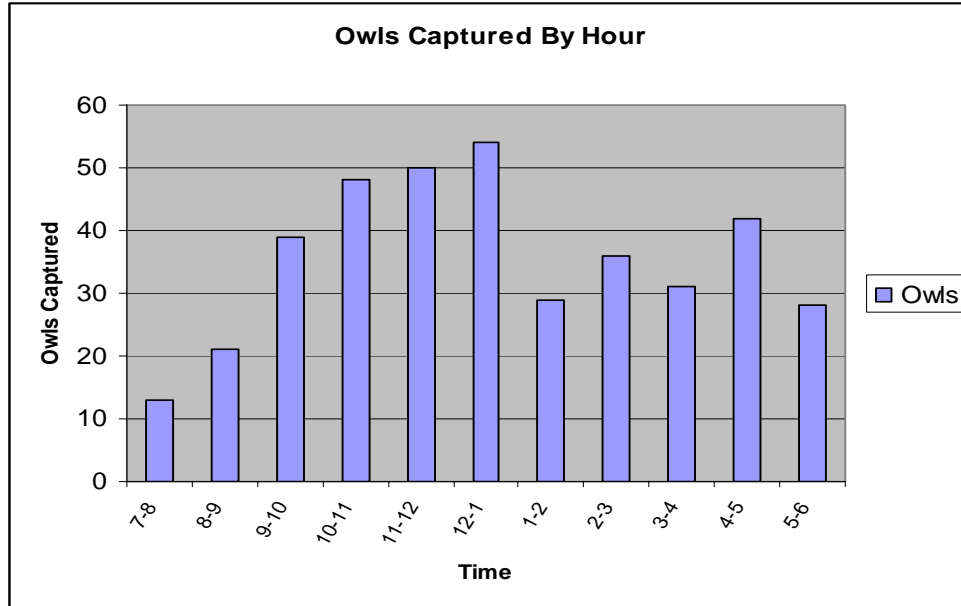


Figure 2. Owls Captured by Hour in 2007

The Nocturnal Owl Monitoring program has incredible potential for research. A summary of demographic statistics for captured owls by year is presented in Table 18. The ratio of hatch-year birds to adults was highest in 2007, which is reflective of higher than normal breeding productivity during the year. The ratio is also high in 2003 as expected. For owls captured in all years combined, a remarkable 70% were female. It is believed that females are larger and hence more aggressive to territorial calls during migration, which would explain higher capture probabilities. It would be very interesting to test this with TTPBRS data by comparing sex differences in

captures by net location. If females are more aggressive we would expect that a higher proportion of females would be captured in nets closest to the sound box. Analysis would be complicated by higher likelihood of the larger females escaping from the smaller-meshed passive nets.

Table 16. NSW Demographics: 2003-2007

Year	Total Cap	HY	F	M	Total Sexed	Percent F
2003	184	0.73	110	22	132	83.33
2004	30	0.56	19	5	24	79.17
2005	71	0.45	31	16	47	65.96
2006	58	0.72	43	8	51	84.31
2007	335	0.8	155	98	253	61.26
Total	678	0.65	358	149	507	70.61

Finches, Martins and Monarchs in Fall 2007

Finches



On November 16, an incredible 70 redpolls of two species were banded at TTPBRS, four days after the season officially ended. This event was purely accidental as the last of the nets were briefly opened for inspection prior to winterizing the station. After a few minutes packing up and assessing nets, an incredible 47 redpolls were found noisily captured in net 7 near a tall birch on the south shoreline. Sure enough, the birch and surrounding shrubs were alive with whirling flocks of redpolls.

We banded 70 redpolls that morning. In the group were 13 much heavier birds, with noticeably darker plumage. These birds were of the *rostrata* subspecies of Common Redpoll, or Greater Redpoll, which breed in Baffin Island and Greenland. Greater Redpolls average about 10% larger than *flammea*, the "mainland" subspecies. The *flammea* birds were mostly 11-13 g in weight, while the *rostrata* birds were generally 16g or more, with one weighing in at over 19g! Also among the flocks of redpolls were two Hoary Redpolls, which were the first ever banded at TTPBRS.

While this event was accidental it was also extremely fortunate as the winter of 2007 will certainly be remembered as an exceptional season for irrupting winter finches moving down from northern forests. These finches descended on southern Ontario and beyond in search of food as seed crops crashed in their normal wintering range. The high number of Pine Grosbeaks and redpolls in southern Ontario doesn't mean that 2007 was a good breeding year for these species but rather that they moved well south of their normal range due to food shortage. Of 70 redpolls captured on November 16 only 62% were hatch-year, indicating that productivity may have been low.

Martins



August 21st was a cool and blustery day of summer and relatively few birds were evident, except for some overhead passage of mixed swallow species. Monarch butterflies were gathering up on poplar and sumac branches. The early closure of our nets due to high winds afforded Ian Sturdee, Seabrooke Leckie and Dan Derbyshire an opportunity to look for Monarchs at the tip near the lighthouse. However, a flock of Purple Martins caught our attention near Pipit Point. A walk to the end of the point revealed wheeling

flocks of American Goldfinches and a large flock of southbound martins. We waited at the tip to look for more migrants and noticed flocks of 50-100 martins flying directly south over our head and then low over Lake Ontario. These birds were clearly migrating and in a hurried fashion, despite the oppressive conditions, which included massive swells and whitecaps, spray and a very strong SE wind! In just over two hours we counted an

amazing 1,215 Purple Martins! Observations also included a Little Gull, several Bonaparte's Gulls, and small numbers of other swallow species.

Purple Martin populations have been unstable for many years in Ontario and sightings of big numbers like this are very rare.

Monarchs



August 31 was a spectacular day for Monarch butterflies at Tommy Thompson Park. Notable numbers were moving through the count area during the morning period, which inspired a visit to the lighthouse area in the afternoon. Several small tree stands were checked between Peninsula B and the lighthouse, and an estimated 17,000-25,000 Monarchs were discovered roosting in numerous sheltered patches within this stretch. The largest congregation numbered an estimated 10,000 individuals, in the leeward side of the tree stand nearest the lighthouse. The butterflies were difficult to detect from the road, but walking into the stand caused them to take flight, creating an impressive swirling

cloud of orange! This discovery further supports Tommy Thompson Park as a site of significance for Monarch populations.

Education, Outreach and Collaborations in 2007

Collaborative Research Projects

In spring and fall 2007, TTPBRS participated in a landmark project by the Canadian Migration Monitoring Network to determine origins of select migratory species. The goal of this project was to draw stable isotopes from tail feathers of CMMN target species to more accurately determine breeding catchment areas that correspond to specific CMMN stations and migratory routes. Nearly 1000 samples were submitted to the project administrators and we look forward to continued participation in this important project.

We also collected ticks for John Scott, coordinator of the Bird Tick Project, which has been operating for over a decade to inventory transport of ticks by migratory birds. TTPBRS collected over 50 ticks of a variety of species for the project.

Education and Outreach



The research station at Tommy Thompson Park continues to engage the community through educational programming. Banding demonstrations and interpretive talks were given to 1744 people at TTPBRS in 2007, which includes 904 from the spring and 840 from the fall. This figure includes park visitors, students and special groups. The Winged Migration program for schools was in full swing in both seasons as groups of 20-30 students from grades 4-7 participated in the program on a daily basis from mid-April to mid-May and mid-September to late October. The program is delivered through the Investigating the Living City Spaces program of Toronto and Region Conservation.

In 2007, staff and volunteers reached out to the community by hosting and delivering workshops and information sessions across the city. Volunteers Julia Marko Dunn and Norma Vanderzon held an information session on TTPBRS programs at Mountain Equipment Coop in downtown Toronto. During the summer, we welcomed Mark Peck of the Royal Ontario Museum to Tommy Thompson Park for a workshop on the Ontario Nest Records Scheme. Two workshops were also hosted in both spring and fall for volunteers of the Fatal Light Awareness

Program. These workshops will assist FLAP in their rescue and rehabilitation efforts. In partnership with the City of Toronto, TTPBRS provided a banding demonstration in October at Milne Hollow Park, one of the key sites in the Project Flyways initiative of the City. In November, TTPBRS presented a display at an information session at P&G.

Volunteers are the foundation of TTPBRS and 2007 was a record year for volunteerism through our programs. Over 4,000 hours were contributed by 27 volunteers, which if continued will ensure that we maintain a high level of efficiency at TTPBRS in the future. Providing educational opportunities for those interested in bird research is a critical role for the research station, as venues for hands-on learning are hard to find. Many of our trainees have gone on to bright futures in the environmental field through experience at TTPBRS. Since 2003, over 100 volunteers have contributed over 16,000 hours to the understanding, protection and awareness of birds in Toronto! In late 2006 a committee made up of TTPBRS volunteers was formed to increase capacity for project management, fundraising and program development. The committee met on a regular basis in 2007 providing critical support to staff and will contribute greatly to the evolution of the bird research station.

TTPBRS was well featured in local, national and international media in 2007, which significantly increased our outreach to the public. Results of our research on erythrism in Baltimore Orioles was published in *Birding*, *Ontario Birds* and *Canadian Geographic*. Articles also appeared in *Now magazine*, *Toronto Star*, *National Post*, and *Globe and Mail* among others. We were very pleased to host the Garden Show with Mark Cullen on CFRB 1010 live from TTPBRS on May 19. Lastly, the Nocturnal Owl Monitoring program of TTPBRS was featured on CBC news Toronto in late fall.

Funding

Baillie Birdathon

In 2006, the TTPBRS Baillie Birdathon fundraiser was launched and was a resounding success as over \$12,000 dollars were raised for our programs. In 2007 we looked to take the fundraiser to the next level with increased participation and the incorporation of celebrity birdathoner Mark Cullen. We were very pleased to have 28 birdathoners raise over \$16,000 for our programs this year!

2007 Birdathon Participants

Connie Agnew	*Don E. Johnston
Ian Argue	Wayne R. King
Natalie Atkinson	*Seabrooke Leckie
Dan Barcza	David Love
Teresa Carlin	Andrew Macdonald
Linda Craib	*Julia Marko Dunn
Mark Cullen	*Anne E. McConnell
Andrew R. Davis	Janice E. McDonald
Rolph Davis	Lori McLean
*Dan Derbyshire	Larry Menard
Tracey Etwell	Christa L. Rigney
Steve Gillis	Josh Shook
Ross Harris	*Ian C. Sturdee
Anne Hume	Judson M. Venier

*denotes fundraising committee members

In 2007, the TTPBRS birdathon was generously supported by Bushnell Outdoor Products, Mountain Equipment Coop, P&G, and the Portlands Energy Project.

Private Donations

A donation of \$10,000 from the John Hackney Foundation for the Noosphere was gratefully received in spring 2007. This support was essential to our operations in 2007 and has positively affected the development of TTPBRS going into 2008!

Membership Program

This year also saw the development and launch of the TTPBRS Membership Program. From early on we've recognized the need to engage the Toronto community in the world of birds and avian studies. It was also clear that we needed to create programs that will keep our operations financially stable over the long-term. The TTPBRS Membership Program addresses these goals and we were pleased to officially welcome our first member in spring 2007. The membership has grown to over 60 members to date who receive three issues of our newsletter *FlightNotes* and also access to exclusive members events. Four events were delivered in fall 2007, all of which were well attended and received by members. Thanks to Dave Beadle and Seabrooke Leckie for assisting with fall events!

Acknowledgements

The following are to be acknowledged for their generous contributions to the Tommy Thompson Park Bird Research Station in 2007:

- Bird Studies Canada and the TTPBRS Baillie Birdathon Team
- Bushnell Outdoor Products
- Mountain Equipment Coop
- TD Friends of the Environment
- Portlands Energy Centre
- Canadian Tire Corporation
- TTPBRS Members
- Proctor & Gamble

We are also indebted to the volunteers who make all of our work possible:

- All the volunteers who lent their skills and time to the birds during the spring, summer, fall and winter
- Jan McDonald for her dedication to the entry of seemingly unending strings of data!
- Seabrooke Leckie for all the vital work she does for TTPBRS
- The TTPBRS Committee



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Appendices

Appendix A. Banding Totals, spring 2007

Species	2007	Average	Species	2007	Average
White-throated Sparrow	395	278	American Tree Sparrow	5	14
Myrtle Warbler	208	173	Rose-breasted Grosbeak	5	9
Swainson's Thrush	127	144	Common Grackle	4	14
Magnolia Warbler	120	115	Great Crested Flycatcher	4	3
Slate-colored Junco	118	56	Cape May Warbler	4	9
Ruby-crowned Kinglet	107	74	Chipping Sparrow	3	4
Golden-crowned Kinglet	106	141	Orange-crowned Warbler	3	3
Hermit Thrush	105	95	Blue-headed Vireo	3	3
Brown Creeper	102	64	Bay-breasted Warbler	2	5
Gray-cheeked Thrush	74	40	Indigo Bunting	2	2
Song Sparrow	69	69	Eastern Kingbird	2	2
Swamp Sparrow	68	62	Tennessee Warbler	2	2
Gray Catbird	61	54	Savannah Sparrow	2	2
Nashville Warbler	58	46	Downy Woodpecker	2	3
Common Yellowthroat	54	63	Scarlet Tanager	1	3
Yellow Warbler	53	68	European Starling	1	4
American Goldfinch	52	47	Blue Jay	1	3
Ovenbird	51	35	Field Sparrow	1	7
Red-winged Blackbird	46	64	Black-capped Chickadee	1	4
Western Palm Warbler	44	35	Yellow-bellied Sapsucker	1	2
Veery	43	38	Blue-gray Gnatcatcher	1	1
Trill's Flycatcher	42	71	Yellow-billed Cuckoo	1	1
Lincoln's Sparrow	38	38	Gambel's White-crowned Sparrow	1	0
Least Flycatcher	34	45	Mourning Dove	1	0
American Redstart	34	48	Sharp-shinned Hawk	1	0
Wilson's Warbler	27	36	Yellow-throated Warbler	1	0
Black-and-White Warbler	25	18	Black-throat. Green Warbler	9	20
American Robin	24	25	Eastern White-crown. Sparrow	31	25
Chestnut-sided Warbler	23	37	Philadelphia Vireo		6
Fox Sparrow	22	18	Eastern Wood-Pewee		5
Yellow-bellied Flycatcher	19	29	Blue-winged Warbler		3
Black-throated Blue Warbler	19	23	Golden-winged Warbler		3
Northern Waterthrush	17	14	Eastern Towhee		3
Brown-headed Cowbird	16	19	Pine Warbler		2
Canada Warbler	14	16	American Woodcock		3
Brown Thrasher	13	14	Northern Parula		2
Wood Thrush	13	10	Northern Rough-wing. Swallow		2
Mourning Warbler	12	14	White-breasted Nuthatch		2
Baltimore Oriole	12	14	Rusty Blackbird		2
Red-eyed Vireo	10	26	Purple Finch		1
Blackpoll Warbler	10	19	Cedar Waxwing		3
Yellow-shafted Flicker	9	6	Red-breasted Nuthatch		2
Warbling Vireo	8	7	Hairy Woodpecker		1
Tree Swallow	8	11	Spotted Sandpiper		1
Winter Wren	7	19	Dunlin		4
Blackburnian Warbler	7	10	Least Sandpiper		2
Northern Cardinal	7	4	Brewster's Warbler		1
House Wren	6	7	Hooded Warbler		1
Eastern Phoebe	6	9	Yellow Palm Warbler		1

Appendix B. Banding Totals in Fall 2007

Species	2003	2004	2005	2006	2007	2007-nsb
American Goldfinch	2	24	15	6	17	
American Redstart	38	51	65	77	42	
American Robin	38	33	11	18	13	
American Tree Sparrow	50	19	18	52	13	2
American Woodcock	2	1			1	
Baltimore Oriole	4	19	10	17	29	
Barn Swallow			2			
Bay-breasted Warbler	4	4	7	25	5	
Black-and-White Warbler	9	11	19	38	10	
Black-billed Cuckoo		2		2	1	
Blackburnian Warbler	1	5	3	19	4	
Black-capped Chickadee	32	54	484	7	95	
Blackpoll Warbler	53	20	36	37	30	
Black-throated Blue Warbler	31	32	33	84	63	
Black-throated Green Warbler	20	35	23	38	13	
Blue Jay	123	9	8	2	35	
Blue-gray Gnatcatcher		1		1		
Blue-headed Vireo	11	17	21	14	10	
Blue-winged Warbler			1			
Brown Creeper	139	97	90	65	108	
Brown Thrasher	3		3			
Canada Warbler	5	12	20	31	14	
Cape May Warbler	5	3	6	8	3	
Cedar Waxwing	19	83	3	8	32	
Chestnut-sided Warbler	21	20	27	54	19	
Chipping Sparrow		2			1	
Common Grackle		4				
Common Redpoll					1	68
Common Yellowthroat	17	28	36	40	41	
Connecticut Warbler	1		1			
Cooper's Hawk	1					
Downy Woodpecker	3	7	6	5	8	
Eastern Kingbird	2	10	5	7	4	
Eastern Phoebe	27	17	18	26	18	
Eastern Towhee	2	1	1	4		
Eastern White-crowned Sparrow	19	26	15	12	19	
Eastern Wood-Pewee	5	2	1	3	3	
European Starling	13	29	8	23	13	
Field Sparrow	5	1	2	5	3	
Fox Sparrow	17	12	14	23	12	
Gamb. White-crown Sparrow	2					
Golden-crowned Kinglet	525	856	685	723	436	
Golden-winged Warbler				1		
Gray Catbird	42	37	26	25	23	
Gray-cheeked Thrush	23	71	92	42	61	
Great Crested Flycatcher	3	1	5	1	2	
Hairy Woodpecker			1			
Hermit Thrush	185	226	208	156	170	1
Hoary Redpoll						2
House Wren	1	3	5			
Indigo Bunting			1		1	
Least Flycatcher	21	27	31	39	23	
Lincoln's Sparrow	16	8	14	14	12	
Magnolia Warbler	76	98	126	345	110	
Marsh Wren	1					
Mourning Warbler	1	7	6	8	6	

Species	2003	2004	2005	2006	2007	2007-nsb
Myrtle Warbler	137	159	285	381	226	
Nashville Warbler	112	129	99	259	109	
Northern Cardinal	8	15	4	8	20	
Northern Harrier			1			
Northern Parula	3	2	8	9	4	
Northern Saw-whet Owl	1					
Northern Shrike	1					
Northern Waterthrush	17	22	25	57	16	
Orange-crowned Warbler	17	12	4	10	6	
Oregon Junco				1		
Ovenbird	16	34	38	62	36	
Philadelphia Vireo	4	4	10	24	11	
Pine Warbler			1			
Purple Finch	2				1	
Red-breasted Nuthatch	2	23	5		16	
Red-eyed Vireo	13	39	60	66	52	
Red-tailed Hawk		1				
Red-winged Blackbird	2	5			1	
Rose-breasted Grosbeak	2	2	3	6	3	
Ruby-crowned Kinglet	399	401	536	539	486	
Savannah Sparrow	1					
Scarlet Tanager		1	3	3	3	
Sharp-shinned Hawk	15	3	4		5	
Slate-colored Junco	132	92	108	139	111	
Song Sparrow	64	44	48	50	62	
Swainson's Thrush	93	117	152	131	144	
Swamp Sparrow	25	23	21	37	33	1
Tennessee Warbler	16	6	18	30	15	
Trail's Flycatcher	32	55	81	82	38	
Veery	21	17	29	41	36	
Warbling Vireo	14	43	14	30	38	
Western Palm Warbler	31	15	16	27	13	
White-breasted Nuthatch			5		4	
White-crowned Sparrow	2			4		
White-eyed Vireo		1				
White-throated Sparrow	394	305	265	183	231	
Wilson's Warbler	29	29	42	66	29	
Winter Wren	52	83	34	20	23	
Wood Thrush	1	1	1	6	1	
Yellow Palm Warbler				1		
Yellow Warbler	20	109	70	46	63	
Yellow-bellied Flycatcher	11	16	18	26	16	
Yellow-bellied Sapsucker	6	20	19	18	9	
Yellow-billed Cuckoo		1			1	
Yellow-breasted Chat		1				
Yellow-shafted Flicker	14	15	8	6	5	
Total Banded	3327	3870	4247	4473	3391	74
Total Species	81	81	79	73	77	5

Appendix C. Spring 2007 Daily Totals

date	pks	band	rec	Cap	census	PC1	PC2	PC3	ST	Casual	NST	species
02-Apr-07	1	50	1	2	306	31	23	11	415	509	801	47
03-Apr-07	5	33	5	1	378	26	19	14	463	864	1086	49
04-Apr-07	1	110	1	61	217	27	28	0	443	567	906	39
05-Apr-07	0	0	0	0	133	0	0	0	133	0	133	26
06-Apr-07	0	0	0	0	178	0	0	0	178	2	180	28
07-Apr-07	0	0	0	0	196	0	0	0	196	0	196	30
08-Apr-07	0	0	0	0	207	0	0	0	207	1	208	26
09-Apr-07	0	0	0	0	241	0	0	0	241	77	295	31
10-Apr-07	4	8	4	0	412	26	6	9	463	534	836	46
11-Apr-07	2	14	2	0	272	9	13	0	310	423	671	50
12-Apr-07	0	0	0	0	203	0	0	0	203	0	203	30
13-Apr-07	0	0	0	0	174	0	0	0	174	0	174	26
14-Apr-07	8	23	8	2	472	18	13	21	544	647	972	56
15-Apr-07	2	1	2	0	328	9	24	7	358	63	390	39
17-Apr-07	7	8	7	0	125	20	0	0	158	479	580	41
18-Apr-07	12	10	12	1	259	31	17	0	321	568	743	48
19-Apr-07	8	13	8	0	171	25	14	8	231	510	671	49
20-Apr-07	4	27	4	0	358	23	5	4	418	391	665	47
21-Apr-07	3	55	4	1	274	22	23	24	387	526	739	56
22-Apr-07	3	91	3	1	316	32	18	32	476	521	803	56
23-Apr-07	4	44	4	0	214	23	19	8	304	517	714	53
24-Apr-07	10	57	10	1	314	36	24	20	441	494	766	56
25-Apr-07	7	15	7	0	187	14	19	19	251	469	636	60
26-Apr-07	1	2	1	0	90	1	0	0	94	144	225	37
27-Apr-07	3	127	3	4	179	32	27	30	371	547	803	57
28-Apr-07	11	54	11	0	199	22	15	37	321	333	557	58
29-Apr-07	12	41	12	0	218	33	21	33	329	410	603	52
30-Apr-07	2	15	2	0	173	0	0	0	190	162	323	50
01-May-07	3	21	3	0	260	18	19	0	312	689	873	57
02-May-07	8	19	7	0	150	23	22	35	250	423	580	53
03-May-07	2	40	2	0	121	10	26	23	217	337	492	52
04-May-07	4	127	4	5	203	30	29	25	388	641	835	65
05-May-07	1	85	1	2	154	23	35	25	311	412	620	70
06-May-07	11	34	11	1	157	22	29	25	258	258	411	54
07-May-07	8	15	8	0	177	17	23	18	245	132	354	68
08-May-07	4	31	4	1	159	17	27	22	236	211	386	64
09-May-07	6	59	6	0	172	26	30	24	289	341	508	67
10-May-07	3	149	3	1	218	43	44	35	464	353	737	81
11-May-07	7	183	7	7	192	45	37	30	468	449	774	96
12-May-07	18	113	18	2	168	0	16	31	332	10	342	58
13-May-07	16	35	16	0	142	33	32	26	262	166	370	63
14-May-07	14	31	14	0	202	21	26	25	292	216	413	70
15-May-07	5	54	5	2	105	30	26	27	243	312	480	81
16-May-07	4	52	4	3	135	40	27	38	282	287	519	74
17-May-07	17	43	17	1	159	27	27	24	284	307	491	81
18-May-07	11	12	11	0	161	31	24	41	235	171	364	71
19-May-07	5	90	5	1	176	22	30	16	327	268	513	78
20-May-07	6	6	6	0	117	0	0	0	129	206	290	58
21-May-07	11	19	11	1	181	18	25	29	262	116	346	66
22-May-07	1	62	1	1	133	19	21	38	267	300	452	76
23-May-07	8	65	8	0	147	34	20	29	280	429	632	76
24-May-07	13	58	13	0	82	31	34	34	242	169	369	70
25-May-07	6	54	6	0	92	28	23	26	220	344	495	65
26-May-07	11	50	11	1	113	28	28	21	239	242	445	66
27-May-07	2	13	2	0	91	0	0	0	106	185	252	51
28-May-07	10	62	10	0	113	22	28	23	245	209	384	65
29-May-07	9	49	9	0	143	37	27	27	259	266	429	59
30-May-07	5	49	5	0	60	18	25	18	168	399	507	65
31-May-07	4	54	4	1	103	31	28	22	236	162	360	55
01-Jun-07	3	32	3	2	138	19	27	22	222	221	356	61
02-Jun-07	4	31	4	0	132	25	27	23	214	177	347	55
03-Jun-07	8	19	8	0	178	14	21	16	245	21	259	46
05-Jun-07	2	2	2	0	143	19	0	0	164	106	237	38
06-Jun-07	4	7	4	1	127	24	28	31	203	253	349	52
07-Jun-07	3	6	3	0	68	0	0	0	77	202	249	40
08-Jun-07	2	9	2	0	135	0	0	0	146	133	236	46

Appendix D. Fall 2007 Daily Totals

date	pks	band	rec	Cap	census	PC1	PC2	PC3	ST	nsb	casual	NST	species
05-Aug-07	0	12	0	0	121	9	16	42	196	0	491	584	43
06-Aug-07	3	21	3	1	191	7	12	71	297	0	627	801	43
07-Aug-07	2	33	2	0	179	9	27	104	348	0	568	792	44
08-Aug-07	1	8	1	0	184	3	10	0	206	0	466	540	39
09-Aug-07	1	1	1	0	167	0	0	0	169	0	102	267	33
10-Aug-07	4	12	4	1	231	12	49	22	294	0	539	748	45
11-Aug-07	2	34	2	0	233	12	30	3	311	0	340	553	47
12-Aug-07	0	15	0	0	170	6	34	28	253	0	360	503	47
13-Aug-07	2	13	2	0	182	3	10	29	239	0	1178	1253	49
14-Aug-07	3	16	3	1	215	10	7	12	263	0	495	635	54
15-Aug-07	0	7	0	0	254	8	158	50	476	0	270	668	45
16-Aug-07	1	18	1	0	286	8	6	13	329	0	386	666	58
17-Aug-07	2	11	2	0	232	11	14	21	291	0	596	676	46
18-Aug-07	2	8	2	0	261	4	16	0	291	0	250	417	43
19-Aug-07	3	40	3	1	181	7	22	20	273	0	407	545	60
20-Aug-07	1	5	1	0	176	0	0	0	182	0	364	419	42
21-Aug-07	0	0	0	0	122	0	0	0	122	0	329	407	43
22-Aug-07	5	45	5	3	324	7	45	19	448	0	779	993	69
23-Aug-07	2	18	2	0	340	6	4	51	419	0	500	792	51
24-Aug-07	4	13	4	1	277	2	59	37	391	0	829	1026	66
25-Aug-07	1	11	1	0	446	0	0	0	458	0	556	803	59
26-Aug-07	0	31	0	3	257	3	2	3	299	0	355	576	75
27-Aug-07	2	23	2	4	157	2	8	17	213	0	411	500	65
28-Aug-07	2	24	2	4	182	5	3	21	240	0	388	530	65
29-Aug-07	4	6	4	2	154	5	2	26	196	0	418	515	55
30-Aug-07	0	5	0	0	235	0	1	12	253	0	580	648	60
31-Aug-07	0	46	0	19	182	4	6	0	253	0	599	796	78
01-Sep-07	1	80	1	2	134	2	2	3	224	0	210	406	59
02-Sep-07	8	37	8	1	201	4	0	0	251	0	327	458	60
03-Sep-07	5	9	5	1	191	2	2	2	212	0	328	419	50
04-Sep-07	7	45	7	2	126	2	5	2	189	0	347	480	63
05-Sep-07	0	0	0	0	116	0	0	0	116	0	1	117	15
06-Sep-07	4	32	4	3	196	2	2	5	242	0	313	471	57
07-Sep-07	7	12	7	0	121	2	0	13	155	0	338	429	44
08-Sep-07	8	22	8	1	156	1	3	7	197	0	155	313	50
09-Sep-07	0	0	0	0	0	0	0	0	0	0	94	94	26
10-Sep-07	1	91	1	1	238	9	5	10	354	0	666	915	76
11-Sep-07	12	18	12	1	218	5	3	2	259	0	224	372	57
12-Sep-07	1	12	1	5	129	9	4	10	169	0	554	637	59
13-Sep-07	2	46	2	1	207	3	27	2	287	0	400	634	67
14-Sep-07	1	13	1	0	137	0	4	3	158	0	351	431	47
15-Sep-07	2	5	2	0	294	0	0	0	301	0	285	577	39
16-Sep-07	1	28	1	0	254	6	0	4	292	0	285	512	69
17-Sep-07	6	26	6	0	113	3	52	4	204	0	397	527	53
18-Sep-07	0	5	0	0	173	3	57	3	241	0	568	716	47
19-Sep-07	1	5	1	0	162	1	2	34	203	0	475	607	44
20-Sep-07	2	49	2	2	178	0	5	3	239	0	776	928	80
21-Sep-07	2	44	2	1	182	0	0	4	233	0	608	782	74
22-Sep-07	1	5	1	0	166	96	0	0	268	0	355	564	46
23-Sep-07	2	52	2	0	215	9	0	0	275	0	625	841	67
24-Sep-07	7	23	7	0	142	23	29	3	227	0	461	620	65
25-Sep-07	5	21	5	0	239	19	128	7	404	0	581	907	65
26-Sep-07	4	11	4	0	174	0	177	401	767	0	1008	1546	56
27-Sep-07	6	173	4	5	270	41	11	10	510	0	755	1218	72
28-Sep-07	2	91	2	3	275	1	28	8	408	0	860	1092	63
29-Sep-07	1	219	1	12	339	20	14	28	610	0	727	1160	69
30-Sep-07	8	62	8	0	413	24	10	59	572	0	595	1059	62
01-Oct-07	7	20	7	0	217	14	21	25	304	0	361	545	49
02-Oct-07	3	7	3	0	225	4	0	0	239	0	180	365	41
03-Oct-07	2	8	2	0	216	1	4	0	231	0	225	355	38
04-Oct-07	6	34	6	0	142	6	2	12	197	0	647	800	54
05-Oct-07	7	119	7	1	137	1	8	13	294	0	526	773	64
06-Oct-07	12	42	12	0	228	6	24	11	316	0	252	508	57
08-Oct-07	15	112	15	7	234	10	4	12	393	0	494	825	57
09-Oct-07	7	68	7	0	172	0	0	0	247	0	302	545	40
10-Oct-07	1	9	1	0	238	0	0	0	248	0	330	465	57
11-Oct-07	9	136	9	4	182	23	3	4	358	0	700	980	57
12-Oct-07	6	193	6	0	172	29	6	0	406	0	812	1005	62
13-Oct-07	0	0	0	0	110	0	0	0	110	0	0	110	16
14-Oct-07	23	247	23	3	243	11	5	0	525	0	564	907	56

date	pks	band	rec	Cap	census	PC1	PC2	PC3	ST	nsb	casual	NST	species
15-Oct-07	30	197	30	21	187	19	15	14	482	0	352	694	51
16-Oct-07	0	0	0	0	119	0	0	0	119	0	163	265	33
17-Oct-07	32	137	32	2	166	16	4	1	357	0	542	799	50
18-Oct-07	9	17	9	0	42	0	0	0	66	0	208	263	31
19-Oct-07	0	0	0	0	241	0	0	0	241	0	0	241	19
20-Oct-07	0	0	0	0	140	0	0	0	140	0	0	140	19
21-Oct-07	8	13	8	1	256	0	0	0	277	0	1228	1366	51
22-Oct-07	10	20	10	0	113	3	0	5	150	0	628	721	52
23-Oct-07	0	1	0	0	0	0	0	0	1	0	137	137	26
24-Oct-07	6	92	6	4	872	12	1	10	985	0	1552	2449	61
25-Oct-07	14	62	14	0	122	17	1	5	210	0	545	707	54
26-Oct-07	12	42	11	1	445	3	2	9	509	0	1935	2107	44
27-Oct-07	1	3	1	0	822	0	0	0	826	0	3637	3903	30
28-Oct-07	2	3	2	0	286	0	0	0	291	0	1543	1756	37
29-Oct-07	7	15	7	0	431	1	0	0	453	0	918	1066	41
30-Oct-07	4	10	4	0	1189	10	0	0	1213	0	929	1485	31
31-Oct-07	5	1	5	0	1074	4	1	0	1083	0	485	1299	41
01-Nov-07	5	11	5	0	927	0	0	7	949	0	451	1346	38
02-Nov-07	3	18	3	0	942	15	4	6	986	1	2190	2498	48
03-Nov-07	3	3	3	0	1481	6	0	12	1501	0	2028	2762	37
04-Nov-07	11	25	11	0	866	15	1	2	913	0	600	1499	46
05-Nov-07	3	4	3	0	810	1	1	0	817	0	2040	2827	35
07-Nov-07	2	0	0	0	986	0	0	0	986	0	520	1502	30
08-Nov-07	2	3	2	0	1001	0	0	0	1006	0	202	1150	29
09-Nov-07	0	0	0	0	1487	0	0	0	1487	0	208	1679	34
10-Nov-07	4	6	4	0	1722	1	0	1	1734	0	2683	4290	42
11-Nov-07	2	1	2	0	2479	0	0	0	2479	0	911	3386	38

Appendix E. Spring 2007 Standard Total Results by Species

spcd	2004	2005	2006	2007	spcd	2004	2005	2006	2007	spcd	2004	2005	2006	2007	spcd	2004	2005	2006	2007
ABDU	27	8	6	25	CCSP			1		HOWA			1	1	RNDU	6	5		
AGWT	2	3	2		CEDW	36	20	29	10	HOWR	28	23	74	16	RNGR	1	2		4
ALFL	11	17	4	1	CHSP	12	11	14	22	INBU	6	2	2	2	RODO	1	1	24	3
AMCO	2		2		CHSW		8	4	26	KIEI		1			RTHU	8	5	10	3
AMCR	18	28	20	38	CMWA	3	5	44	15	KILL	7	31	45	30	RUBL	25	29	17	7
AMGO	319	443	420	618	COGO	77	116	17	19	LEFL	95	65	88	69	RUTU				1
AMKE		1	2	1	COGR	338	416	458	656	LESA			3	0	RWBL	955	1580	1850	1763
AMPI	4	14	5	5	COHA			1	1	LESC	242	259	77	51	SAVS	0	4	8	7
AMRE	98	108	87	82	COLO	51	24	14	27	LEYE	4	1	1	5	SBDO			7	1
AMRO	264	445	397	495	COME	13	20	72	126	LISP	33	48	58	48	SCJU	87	157	146	361
AMWI	5	6			COYE	134	113	65	90	MALL	367	443	495	451	SCTA	9	20	6	10
AMWO	7	12	9	2	CSWA	82	82	58	47	MAWA	229	144	128	187	SEPL			1	1
ATSP	43	32	39	6	DOWO	5	22	16	48	MERL		1	2		SESA			20	
BANS	46	59	110	18	DUNL	4		64		MODO	28	21	31	49	SOSA			1	
BAOR	88	120	217	222	EAKI	47	68	93	116	MOWA	26	19	26	17	SOSP	506	615	729	708
BARS	41	85	63	43	EAME				1	MUSW	146	265	224	204	SPSA	87	91	81	76
BAWW	35	42	36	48	EAPH	18	15	30	16	MYWA	514	337	342	582	SSHA		1		2
BBCU		1		1	EATO	15	13	21	7	NAWA	106	91	49	104	SWSP	113	88	101	100
BBPL	1	2	6	1	EAWP	38	29	23	26	NOCA	64	77	77	98	SWTH	126	236	197	157
BBWA	21	13	15	13	EUGO				1	NOHA		4	1		TEWA	4	6	6	6
BCCH	47	120	119	102	EUST	418	321	448	473	NOMO			1		TRES	486	680	1036	528
BEKI	15	27	67	67	FISP	3	16	10	3	NOPA	5	2	9		TRFL	146	59	69	53
BGGN	6	17	3	6	FOSP	23	37	52	69	NOPI		6	2		TRUS	1	3		0
BHCO	509	705	716	832	FOTE			1	1	NOWA	21	36	8	30	TUSW				
BHVI	7	9	4	7	GADW	122	149	108	148	NRWS	16	23	61	3	TUVU		1		4
BLBW	29	34	20	23	GBBG	12	3	9	1	NSHO	2	8		4	VEER	46	70	46	62
BLJA	46	24	38	25	GBHE	3	8	10	8	OCWA	5	4	3	3	WAVI	106	255	221	264
BLPW	65	36	46	32	GCFL	17	11	11	13	OLDS	2493	4751	2034	1693	WBNU	8		3	
BLSC		3		1	GCKI	87	613	307	328	OSFL			1		WCSP	48	53	66	57
BLTE		1			GCTH	40	47	57	85	OSPR			1		WIFL	51	89	89	8
BOBO			1	7	GHOW			2		OVEN	44	76	37	76	WIWA	74	56	38	46
BOGU	27	2	7	45	GLGU	0	3		2	PBGR			1	3	WIWR	38	35	49	37
BRCR	66	141	204	223	GRCA	206	180	209	178	PEFA		2			WODU	3	16	7	4
BRTH	76	60	22	57	GREG	4	6	11	2	PHVI	23	5	3	3	WOTH	9	21	12	16
BRWA			1		GRSC	341	408	113	69	PISI	2				WPWA	100	71	50	107
BTBW	48	49	29	51	GRYE	2	5	4	10	PIWA	12	2	3	4	WTSP	528	484	838	693
BTNW	77	41	32	37	GWWA	4	2		1	PUFI	10	5	2		WWSC	151	114	4	304
BUFF	820	992	817	830	HAWO	2		14		PUMA	2				YBCU	2		1	1
BWTE	3	1			HERG	126		32	49	RBGR	12	40	28	28	YBFL	50	28	29	27
BWWA	7	6	3		HETH	111	160	234	176	RBME	21	9	11	21	YBSA	6	6		2
CACG		1			HOFI	2			2	RBNU	4	6	4		YPWA			1	
CAGO	601	614	353	492	HOGH	19			12	RBWO				1	YSFL	138	130	137	159
CANV		1	2	6	HOLA	2				RCKI	118	124	200	227	YTWA				1
CAWA	51	26	14	20	HOME	1	3		3	REDH	6	8	2	2	YWAR	531	669	709	737
					HOSP	0			3	REVI	125	40	95	74					