

## EXECUTIVE SUMMARY

The year 2003 marked the tenth year of migration monitoring at LSLBO. Spring migration was a relatively quiet affair. Coverage extended from April 21- June 10 with 50 days of monitoring. Netting effort was impacted due to cold weather and flooding of 2 net lanes for most of the spring but in general the spring passage was slow. A capture rate of 33.1 birds/100 net-hours was rather low. Fall migration coverage ran from July 12 - September 30 with 77 days of coverage. Banding started off briskly but was also relatively quiet with a capture rate marginally better at 57.2 birds/net-hour. During the 2003 migration seasons, 163 species were recorded at the station. Red-throated Loon was the only species added to the LSLBO checklist, bringing the total of birds recorded in the area to 238.

Following recommendations from last years' report, the Fern Gulley MAPS stations was re-activated for the first time since 1999. Four MAPS stations received full coverage in 2003. From June 11 to August 5, 589 birds were captured including 423 banded, 156 recaptured, and 10 unbanded. All stations had more captures than 2002, including RESI which had a record total of 218 captures. New species banded at the MAPS stations in 2003 included Downy Woodpecker, Northern Flicker, and Ruby-crowned Kinglet. Breeding status was determined for the 58 species recorded at the stations. Return rates and the productivity of the 10 most commonly captured species were also examined.

There were 480 retrap records in 2003. All retraps were originally banded at LSLBO. The vast majority of these were repeats (birds caught during the same season of banding). Ninety-three records were of birds banded in 2002. Thirty-seven recaptured birds were originally banded in 2001 or earlier. Older recoveries included an eight year old Red-eyed Vireo, two American Redstarts and a Canada Warbler were at least six years old when recaptured.

Several research projects were initiated or continued in 2003. A pilot project on the breeding ecology of the Canada Warbler--a relatively common species in the area but not well studied--was begun. Adult Canada Warblers were individually colour marked at the migration station in the spring and throughout the breeding season at MAPS stations and followed in the field on a 13.5ha plot to determine, territory size and density, pairing and nesting success, and other aspects of the breeding biology of this species. As recommended in the 2002 annual report, banding at the MAPS stations was extended into the fall season to detect differences in migratory route and habitat preferences between adult and juvenile passerines. Preliminary results suggest differences do exist and further study will be required. Moulting data were again collected in 2003 with an excellent effort put forth by staff to collect the information. Nearly 350 records were collected from early July through the end of fall banding. Preliminary results suggest that there are age and sex related differences in the timing of the adult pre-basic moult among species and that the rate of the progression of this moult varies between species.

## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b><u>-i-</u></b>
<b>MIGRATION MONITORING.....</b>	<b><u>1</u></b>
<b>Spring Migration.....</b>	<b><u>1</u></b>
<b>Fall Migration.....</b>	<b><u>3</u></b>
<b>MONITORING AVIAN PRODUCTIVITY and SURVIVORSHIP (MAPS) .....</b>	<b><u>7</u></b>
<b>Captures.....</b>	<b><u>7</u></b>
<b>Breeding Status .....</b>	<b><u>12</u></b>
<b>Productivity .....</b>	<b><u>13</u></b>
<b>Returns and Survivorship .....</b>	<b><u>14</u></b>
<b>RECAPTURES .....</b>	<b><u>15</u></b>
<b>COVERAGE .....</b>	<b><u>16</u></b>
<b>VISITORS AND EDUCATION .....</b>	<b><u>20</u></b>
<b>OTHER OBSERVATORY ACTIVITIES.....</b>	<b><u>20</u></b>
<b>Canada Warbler Project .....</b>	<b><u>20</u></b>
<b>Moult Study .....</b>	<b><u>20</u></b>
<b>MAPS season extension .....</b>	<b><u>23</u></b>
<b>RECOMMENDATIONS.....</b>	<b><u>24</u></b>
<b>REFERENCES.....</b>	<b><u>25</u></b>
<b>ACKNOWLEDGEMENTS .....</b>	<b><u>26</u></b>
<b>APPENDICES .....</b>	<b><u>27</u></b>
<b>APPENDIX I. Species arrival and departure dates and maxima at LSLBO in 2003. ....</b>	<b><u>28</u></b>
<b>Appendix II. Banding Totals at LSLBO in 2003.....</b>	<b><u>32</u></b>
<b>Appendix III. Moult score data collected in 2003.....</b>	<b><u>34</u></b>

## MIGRATION MONITORING

Migration monitoring remains one of the core programs of the Lesser Slave Lake Bird Observatory. The year 2003 was another successful one for monitoring at LSLBO and marked the tenth year of coverage at LSLBO. Weekly summaries of the spring and fall migration are outlined below.

### Spring Migration

The spring migration of 2003 at LSLBO was similar to that of many monitoring stations across Canada. Weather conspired to make migration almost a non-event. It was a very cold spring with morning temperatures consistently below 0EC until the fourth week of May which coincided with the departure of the ice off the eastern basin of Lesser Slave Lake. The last snow fall was recorded on May 17. The station opened up on April 21 and migration monitoring ran through to June 10 for a total of 50 days of coverage. Several days of precipitation often in the form of snow, hampered netting efforts. In 39 days of banding 692 birds of 46 species and forms were banded resulting in the lowest spring banding total since 1998. Banding effort was somewhat lower than the last few years due to the number of days lost due to poor weather. Also, two net-lanes were flooded out and inoperative for most of the spring. The pace of migration as usual was dictated by weather events and in general the passage for most species was a week to 10 days later than usual.

Migration monitoring began on April 21, a calm and pleasant day. The most visible migrants were Tundra Swans flying north in small flocks totalling almost 200 birds. Other waterfowl seen on the narrow stretch of open water along the shore included small numbers of Mallard and American Wigeon. Most abundant were Common Goldeneyes. Apart from resident Bald eagles and Merlins, a Northern Harrier and two Sharp-shinned Hawks were seen. Passerine migration was virtually non-existent with very small numbers of the usual early migrants, Ruby-crowned Kinglets, American Robins, American Pipits, Song Sparrows and blackbirds. Small numbers of Dark-eyed juncos suggested that migration of this species through the area was near completion.

As expected, new arrivals were recorded almost daily during the fourth week of April with Sandhill Cranes, Franklin's Gulls, Northern Flickers, Eastern Phoebe, Hermit Thrushes. But this week was quieter than normal for several species. Northern Harriers, which normally have a peak day of 20 - 30 birds only reached a season high of six birds on April 22. This day also produced the maximum number of American Robins (146) and Yellow-rumped Warblers (11) for the week and the season peak day-total of American Tree Sparrows (7). The fourth week of April also generated peak day-totals for American Green-winged Teal (35), Bufflehead (4), and Dark-eyed Juncos (75). The Junco peak took form in a last push on April 25, preceding the arrival of a front which brought cold, unsettled weather with sleet and snow over the next two days. The last few days of April saw the first arrival of several species including Yellow-bellied Sapsucker, Tree Swallow, Fox and Savannah sparrows. With banding on only 6 days and nets open for limited hours, only 35 birds were banded in April.

The first week of May was a washout as far as banding was concerned. Only two birds were banded on May 1 and foul weather did not allow banding again until May 8. However, despite

the poor weather migration was still occurring, albeit at a slower than normal pace. Common Loons, Blue-winged Teal, Northern Shoveler, Osprey, Red-tailed Hawk, Orange-crowned and Palm warblers, Lincoln's, Swamp, White-throated and White-crowned sparrows and Brown-headed Cowbirds all made first appearances at the station during the first week of May. A hundred or more Greater White-fronted Geese were seen flying in skeins overhead almost daily. Peak day-totals were recorded for several early migrants this week including; Sandhill Cranes (290), Greater Yellowlegs (16), Hermit Thrushes (16), American Robins (294), American Pipits (66), Orange-crowned Warblers (17), Lincoln's (6), and White-crowned (22) sparrows, Lapland Longspurs (13) and Snow Buntings (13). The appearance of four Varied Thrushes on May 3 was a good sighting but perhaps more impressive were the 24 Fox Sparrows observed on May 4.

The pace of migration picked up during the second week of May as weather improved. The number of species recorded daily jumped considerably with the arrival of many neotropical species overlapping with the presence of many temperate species still moving through. As many as 66 - 71 species were seen most days. Banding was still relatively slow with a peak of 13 birds banded on May 9, 12, & 14. Only 75 birds were banded the entire week. On May 9 and 10 thousands of White-fronted Geese moved through the area along with small numbers of Snow Geese, an uncommon migrant through the area in the spring. Several other waterbirds made first appearances during the first few days of the second week of May including Red-necked Grebe, Double-crested Cormorant, Gadwall, Canvasback, Surf and White-winged scoters, Lesser Yellowlegs, Spotted Sandpipers, Common and Forster's terns. Almost like clockwork, the Mew Gull passage began on May 9. Other migrants arriving this week included Least Flycatcher, Say's Phoebe, Blue-headed Vireo, Winter Wren, Gray-cheeked and Swainson's thrushes, Yellow, Black-throated Green, and Black-and-white warblers, American Restarts, Ovenbirds, Northern Waterthrush, Chipping, Clay-colored, Vesper, and Le Conte's sparrows, and Rose-breasted Grosbeaks. Species reaching their season peak day-totals during the second week of May included; Canada Geese (184), Blue-winged Teal (15), Northern Shoveler (13), American Wigeon (33), Lesser Scaup (13), Surf Scoter (121), Lesser Yellowlegs (12), Solitary Sandpipers (4), Bonaparte's (43), Franklin's (1273), and Mew (25) gulls, Yellow-bellied Sapsucker (8), Northern Flicker (15), Blue Jay (14), American Crow (55), Ruby-crowned Kinglet (10), Yellow-rumped Warblers (799), White-throated Sparrows (20), Red-winged (222) and Yellow-headed blackbirds (13), and Brown-headed Cowbirds (40).

Cold weather for much of the first half of the third week of May seemed to stall migration. Cool northwesterly breezes blew and it snowed heavily on May 17. Only 27 species were observed this day but most other days this week had 40 - 50 species recorded. Banding was only marginally better than the previous week but still quite low at 125 birds. The only new arrivals this week were Bank and Barn swallows and Western Tanagers. Peak day-totals were observed for Sharp-shinned Hawk (4), Ring-billed Gulls (16), Tree (36) and Bank (202) swallows. Last sightings of the spring were recorded for several migrants this week included Red-tailed Hawk, Sandhill Cranes, Solitary Sandpipers, Mew Gulls, Say's Phoebe, American Pipit, Savannah and Le Conte's sparrows.

The fourth week of May was by far the busiest of the spring. The ice finally broke up and left the eastern basin. Shortly after the ice left American White Pelicans and Long-tailed Ducks were

seen on the lake. Other new arrivals this week included Great Blue Heron, Least Sandpiper, Ruby-throated Hummingbird, Western Wood-Pewee, Alder Flycatcher, Red-eyed Vireo, Cedar Waxwing, Tennessee Warbler, Blackpoll Warbler, and Baltimore Oriole. Just over 300 birds were banded this week. May 25 in particular was quite busy. It was the only day of the spring with over 100 birds banded and nearly 70 species were recorded at the station. Several other new arrivals were noted on this day including Black Terns, Magnolia, Mourning, Wilson's, and Canada warblers. The spring's only Gray Catbird was seen on this day. May 25 also saw peak day-totals for several species such as Spotted Sandpiper (8), Least Flycatcher (50), Barn Swallows (6), Swainson's Thrush (39), Yellow Warbler (13), Black-and-white Warbler (6), American Redstart (76), Ovenbird (15), Common Yellowthroat (5), Rose-breasted Grosbeak (16), and Baltimore Oriole (8), Chipping (930), and Clay-colored (19) sparrows. On May 27, peak totals of Common Loons (80) were recorded as large rafts of loons were seen on the lake as well as several birds flying through the area. On this day four Red-throated Loons were seen about 400 metres offshore. This represented the first sighting of this species for the area.

By early June migration was winding down for most species and many were already establishing territories. Both males and females of several songbird species caught were showing physical evidence of breeding. In the first 10 days of June only 82 birds were banded. Thirty to fifty species of birds were being observed daily. Typically late arriving species such as Alder Flycatchers, Red-eyed Vireos, Cedar Waxwings, Canada Warblers and American Goldfinches were later than usual. Birds of many of these species started arriving in late May and increased in June but probably did not reach their migratory peak or completed migration by the end of the season. Banding totals for some such as Alder Flycatchers and Canada Warblers were similar or lower than in 2002—another cold and late spring—attesting to the lateness of their migration.

### **Fall Migration**

Fall migration monitoring ran from July 12 to September 30. Weather during fall was generally quite warm with several days of 30EC weather. Precipitation was generally in the form of brief light showers or thunder showers. Relatively little coverage was negatively impacted by weather until later in the season. It was a the fourth busiest fall for banding with just over 2600 birds banded. The second half of July was especially. There were four days in August and September which had 100 or more birds banded but there were also many quiet days with 20 days having fewer than ten birds banded when netting was attempted. Yellow-rumped and Tennessee warblers were the two most commonly banded species, but not in record numbers as in fall 2002. The following is a weekly account of the fall migration.

Monitoring and banding started on July 12. Small numbers of waterbirds including loons, grebes, Mallard and Common Goldeneye were seen daily but no evidence of migratory activity was apparent as many birds still had small, flightless young. Forty-one birds were caught on the opening day but as with many non-passerines, there was little migration in evidence. There was still some singing in the mornings and a lot of breeding behaviour, namely feeding of fledglings. Very little migratory activity was seen on the hourly visible-migration watches until well into the third week of July. Most birds captured in the following days were moulting adults or young in juvenal plumage.

The fourth week of July was quite warm with highs around 25EC. The week was mostly clear with light westerly winds. Three hundred and eighty-one birds were banded with the busiest day being the 23<sup>rd</sup> when 99 birds were banded. This day also had the biggest species diversity with 47 species recorded at the station. The first Sharp-shinned Hawk, Blue Jay, and Savannah Sparrow of the fall were seen this week and peak single-day totals were had for American Redstart (33), and Lincoln's Sparrow (8).

The last few days of July were quite warm, hitting 30EC on several days. Several new species arrived near the end of the month including Greater Yellowlegs, Philadelphia Vireo, Barn Swallow, Cape May Warbler, and the second Nashville Warbler ever recorded at the station was caught and banded on July 31. July 31 was quite a busy day as 48 species were record and 141 birds were banded. Most common captures were Tennessee and Yellow-rumped warblers and American Redstart. The last few days of July also saw peak day-totals for several species including Ring-billed Gull (140) and Common Tern (40), Least Flycatcher (12), Tree Swallow (4), Song Sparrow (7) and Rose-breasted Grosbeak (8).

The weather during the first week of August was still quite warm with mostly light westerly winds but several days were overcast and thundershowers occurred on Aug 5 and 7. Thirty-two to 55 species were recorded daily. August 2 was the busiest day in the lab with 66 birds banded consisting mostly of American Redstarts, Canada and Tennessee warblers. The first Great Blue Herons, Green-winged Teals, Western Wood-Pewees, American Kestrels, and Wilson's Warblers of the fall were recorded as well as the only Caspian Tern of the year. This week also had season high day-totals for several neotropical migrants including Alder Flycatchers (17), Bank (45) and Barn (3) swallows, Canada Warblers (15) and Chipping Sparrows (37). The last Ruby-throated Hummingbird of the fall at the observatory was seen on Aug 6.

The second week of August had rain on most days with highs in the low to mid 20s. A cold front on Aug 10 brought winds and rain and was poor for migration. Thirty-one to 48 species were being recorded daily. The busiest day of banding was Aug 11 when 49 birds were banded. The banding total for the week was only 191 birds but netting was reduced on several days due to weather. New arrivals this week included Canada Goose, Lesser Yellowlegs, and Orange-crowned Warbler. Several migrating flycatcher species tend to show up in the second week of August and this year was no different. Olive-sided and Yellow-bellied flycatchers, and Eastern Kingbird all showed up and Eastern Phoebe had their peak fall numbers (8). Single-day peak totals were also recorded for American Crow (70), Swainson's Thrush (12), Northern Waterthrush (7), Wilson's Warbler (3), Rose-breasted Grosbeak (8) and the last Black-throated Green Warbler recorded in the fall was seen Aug 14.

The third week of August was generally calm and clear with only light showers on Aug 16. Day time temperatures were in the low to mid 20s but reached 31.5EC on Aug 18. Twenty-six to 64 species were recorded daily. Despite the relatively high species counts many species, the numbers of many migrants especially neotropical migrants were decreasing. Even with very accommodating weather banding was generally quite slow with only 154 birds banded. August 18 was the busiest day when 38 birds were banded. Tennessee and Yellow-rumped Warblers were still most common but only seven of each were banded that day. New species recorded for

the fall this week included Least Sandpiper, Bonaparte's and Franklin's gulls, Belted Kingfisher, Say's Phoebe, and Red Crossbill as well as the season's only Northern Goshawk on Aug 20. Peak-day-totals were had for Northern Harrier (5), Eastern Kingbird (5), Western Tanager (16), Clay-colored Sparrow (4) and Evening Grosbeak (43). During the third week of August the last sightings of the fall for Warbling Vireo and Chipping Sparrow at the station were had.

Unstable weather was present much of the fourth week of August. Most days were overcast with periods of rain and the first half of the week had moderate to strong westerly winds blowing. Daytime temperatures were only in the teens. The number of species seen on a daily basis ranged from 21 to 45 species. Banding was slow on most days with 185 birds banded, 104 of these on Aug 27. The vast majority of the birds banded on Aug 27 were Yellow-rumped Warblers whose numbers had been dropping substantially over the previous week or so but were increasing again in the latter days of August. Possibly these were migrants from populations breeding in the far north part of their range. In the fourth week of August more temperate migrants were appearing including American Pipits and White-crowned Sparrows. Peak day-totals were recorded for Franklin's Gulls (550), Cedar Waxwings (50) and Philadelphia Vireos (3).

The last few days of August were mostly clear and calm. Species counts were relatively high as more temperate migrants were arriving including Blue-winged Teal, Buffleheads, Red-tailed Hawks, and Golden-crowned Kinglets. As many as sixty species were seen on Aug 29 which was also the busiest banding day of the period. Twelve warbler species including the second Nashville Warbler of the fall were among the 20 species banded that day. Several species had fall peak day-totals in the last three days of August including Sharp-shinned hawks (32), Magnolia (6) and Yellow-rumped (2208) warblers.

Temperatures were still quite pleasant during the first week of September with lows averaging 10EC and an average high of 25EC. Seventeen to 43 species were seen daily. The falls' first American Wigeon, Sandhill Crane, Boreal Chickadee, Lapland Longspur, and the only Broad-winged Hawk were observed in the first week of September. Peak day-totals were recorded for Northern Harrier (5), American Kestrel (4), and Common Tern (40) while several species were last seen for the year including Spotted Sandpiper, Franklin's Gull, Belted Kingfisher, Yellow-bellied Sapsucker, Northern Flicker, Red-eyed Vireo, Yellow, Cape May, Black-and-White, and Mourning warbler, Ovenbird, Western Tanager, Clay-colored Sparrow, Rose-breasted Grosbeak, and Red-winged Blackbird. It was moderately busy in the banding lab as 222 birds were banded during the first week of September. Most of this was done on Sep 2 when a good push of late migrants came through with many birds hitting the nets. One hundred and fifty birds were banded—over 120 Yellow-rumped Warblers—and nine other warbler species were banded in small numbers.

Several days of unsettled weather with wind and rain during the second week of September severely slowed migration. Nineteen to 33 species were seen daily and passerine numbers were pretty low. September 14 was the only day with more than 10 birds banded with 31 birds—mostly Yellow-rumped Warblers—banded. Northern Pintail, White-fronted Goose, Short-eared Owl, and Dark-eyed Junco all made season first appearances. Bald Eagles (12), California Gulls

(4), and White-crowned Sparrows (5) had season day-peaks during the second week of September and several neotropical migrants including Least and Alder flycatchers, and Tennessee and Wilson's warblers as well as Savannah Sparrows had last sightings of the fall this week.

The last half of September was very quiet. Only 177 birds were banded in eight days of banding from Sep 16 - 30. Weather precluded banding on September 16 & 17 when the first sub-zero temperatures of the fall were recorded. Snow, rain and winds prevented any banding on September 22 and 23. September 19 was by far the busiest day of the period. A large flock of low-flying birds hit the nets simultaneously, resulting in 128 birds banded—mostly Yellow-rumped Warblers. Other late warblers flying in the flock included an American Redstart, a few Magnolia Warblers and several Orange-crowned Warblers. A high pressure system settled over much of Alberta in the last week of September staying well into the second week of October. Sunny skies and calm clear with above seasonal temperatures seemed to effectively stall migration and late temperate migrants seemed to be in no rush to pass through the area. Only two American Tree Sparrows had been recorded by the end of the month and only a few more Dark-eyed Juncos had shown up by the end of migration monitoring coverage on September 30.

### **MONITORING AVIAN PRODUCTIVITY and SURVIVORSHIP (MAPS)**

The Monitoring Avian Productivity and Survivorship (MAPS) program is a continent wide project run by the Institute for Bird Populations. It is a cooperative effort among public agencies, private organizations, and bird banders. It provides long-term data on population and demographic parameters for target landbird species across the continent. More specific information about the program and site specific information about the LSLBO stations can be found in Desante (2001), Jungkind (2000), and Savignac (2000).

Four stations were operated in 2003 when Fern Gulley (FEGU)—situated between ROAD and FAWA—was reactivated and operated for the first time since 1999. FAWA, ROAD, and RESI had a full complement of net-hours (360) but rain interrupted the last round at FEGU, leaving that station with 344.7 net-hours. The dates of operation were:

	<b>FAWA</b>	<b>FEGU</b>	<b>ROAD</b>	<b>RESI</b>
Period 5 (Jun 10 - 19)	Jun 12	Jun 12	Jun 11	Jun 17
Period 6 (Jun 20 - 29)	Jun 25	Jun 24	Jun 24	Jun 26
Period 7 (Jun 30 - Jul 9)	Jul 2	Jul 1	Jul 1	Jul 4
Period 8 (Jul 10 - 19)	Jul 11	Jul 10	Jul 12	Jul 13
Period 9 (Jul 20 - 29)	Jul 22	Jul 20	Jul 23	Jul 21
Period 10 (Jul 30 - Aug 9)	Aug 4	Aug 5	Aug 2	Jul 30



## Captures

A total of 589 birds were captured in 2003 included 423 banded, 156 recaptured, and 10 unbanded (Tables 1a - 1d). All stations had more captures than 2002, including RESI which had a 218 captures, a record number for the station. New species banded at the MAPS stations in 2003 included Downy Woodpecker, Northern Flicker, and Ruby-crowned Kinglet.

The last MAPS round (Jul 30 - Aug 8) was the busiest and had the highest number of captures at each station except FAWA. This was particularly true at RESI where 122 birds were caught on July 30. This phenomenon has been noted in previous years and is probably the result of the high level of juvenal dispersal overlapping with migration. The vast majority of birds caught at this time were juvenile Tennessee and Yellow-rumped warblers. However, the last visit at Fern Gulley yielded a relatively high proportion of adults, most showing flight feather moult.

**Table 1a. Captures at the Far Away (FAWA) MAPS station.**

Species	2003 Captures			Previous Years' Total Captures								
	Band	Recap	Unband	'94	'95	'96	'97	'98	'99	'00	'01	'02
Downy Woodpecker										1		
Least Flycatcher	1			3	1						9	1
Swainson's Thrush					4	1		1		1		1
Hermit Thush	2											
American Robin				3	1	1			1		1	3
Cedar Waxwing				1								
Phialdelphia Vireo								1				
Red-eyed Vireo	1			2	2						1	
Tennessee Warbler	2				1		1				1	4
Yellow-warbler				2			1				2	
Chestnut-sided Warbler				1								
Magnolia Warbler									1			
Yellow-rumped Warbler	7			1			5	3		3	4	4
Black-and-white Warbler	1								1			
American Redstart	2	5		18	10		2	4	2	8	7	2
Ovenbird	1			1	1	1	10	1	4	5	4	3
Connecticut Warbler									1			
Mourning Warbler	4	1		11	19	1	3	7	9	4		2
Common Yellowthroat					1				1			
Canada Warbler	7	6		4	12	2	8	13	15	10	8	7
Western Tanager								1				1
Rose-breasted Grosbeak										1		
White-throated Sparrow	9	5		16	26	12	10	8	10	10	11	7
Total	37	18		63	78	18	40	39	45	43	49	35

**Table 1b. Captures at the Fern Gulley (FEGU) MAPS station.**

Species	2003 captures			Previous years' totals					
	band	recap	unband	'94	'95	'96	'97	'98	'99
Northern Saw-whet Owl							1		
Alder Flycatcher				2	3	1			
Least Flycatcher	3			2					
Blue-headed Vireo	1					1		1	
Red-eyed Vireo	2			1	1			1	1
Black-capped Chickadee				3	1			3	
Red-breasted Nuthatch				1		1		2	
Winter Wren								2	1
Swainson's Thrush	5	3		13	7	3	9	14	4
Hermit Thrush								1	
American Robin	1			3					1
Cedar Waxwing	1								
Tennessee Warbler	18		2	2	8	2	3	13	2
Orange-crowned Warbler				1					
Yellow Warbler	3				5	3		3	2
Chestnut-sided Warbler				1				1	
Magnolia Warbler	3	2		1	2	1	3	5	5
Yellow-rumped Warbler	2			7	2		3	10	4
Black-throated Green Warbler									1
Black-and-white Warbler	1	2		3	2	1	3	1	2
American Redstart	31	20		52	69	8	35	25	48
Ovenbird	6	3		3	7	2	9	12	8
Northern Waterthrush	1						1		
Mourning Warbler	3	1		9	7	7	10	14	4
Canada Warbler	22	14		14	31	10	12	25	20
Western Tanager	2							1	
Chipping Sparrow								2	
Song Sparrow							1	4	
Swamp Sparrow									2
White-throated Sparrow	10	6	1	24	26	6	10	26	10
Pine Siskin							1	1	
Total	115	51	3	142	171	46	101	167	115

**Table 1c. Captures at the Roadside (ROAD) MAPS station.**

Species	2003 Captures			Previous Years' Total Captures								
	Banded	Recap'd	Unband	'94	'95	'96	'97	'98	'99	'00	'01	'02
Ruffed-Grouse								2				
Yellow-bellied Sapsucker	1			1	3	2						
Downy Woodpecker	1											
Hairy Woodpecker			1									
Pileated Woodpecker											1	
Yellow-bellied Flycatcher				1								
Alder Flycatcher				1		3		1				1
Least Flycatcher				4				3				2
Black-capped Chickadee	2	2		1					1		1	1
Red-breasted Nuthatch								1				
Brown Creeper											1	
Winter Wren	2				1					1		
Winter Wren	2											
Swainson's Thrush	8	8		11	3	1	2	11	8	12	5	8
American Robin					1			1				2
Cedar Waxwing				2				1				
Warbling Vireo								1				
Red-eyed Vireo		1		1	1							1
Tennessee Warbler	7	1		22	2		2	10	5		1	8
Orange-crowned Warbler				1								
Yellow Warbler				6								2
Chestnut-sided Warbler				4								
Magnolia Warbler	3	6		11	6	4	11	10	24	10	15	8
Cape May Warbler	1							2				
Yellow-rumped Warbler	13	4		16	5	4	1	22	2	1	1	2
Black-throated Green Warbler	1					1		4		1		
Palm Warbler				1								
Blackpoll Warbler								2				
Black-and-white Warbler	3	4		9			2	3	1	3		
American Redstart	9	8	1	37	22	12	13	21	15	8	12	31
Ovenbird	13	9		6	1		3	22	9	8	12	14
Northern Waterthrush		1				1						
Mourning Warbler				5	2	1	5		2			
Common Yellowthroat								2				
Canada Warbler	10	10		32	19	8	20	13	12	13	13	9
Western Tanager				1	1			1				
Rose-breasted Grosbeak				1				3				
Chipping Sparrow	2	2		2				4	1			5
Song Sparrow				2								
Lincoln's Sparrow	1					1						
White-throated Sparrow	2	7		22	16	9	18	16	5	3	6	4
Purple Finch								1				
Pine Siskin								1				
Total	80	64	2	200	83	47	77	158	85	60	68	nn

**Table 1d. MAPS captures at Residence (RESI) station in 2003.**

Species	2003 Captures			Previous Year Totals		
	Banded	Recaptured	Unbanded	2000	2001	2002
Sharp-shinned Hawk				1		
Ruby-throated Hummingbird						1
Yellow-bellied Sapsucker	3	1		2	3	6
Northern Flicker	1					
Western Wood-Pewee				1		
Alder Flycatcher					1	
Least Flycatcher	4	2		11	8	14
Black-capped Chickadee	5			1		6
Red-breasted Nuthatch	2					1
Brown Creeper	2					
Winter Wren	1				1	2
Ruby-crowned Kinglet	2					
Swainson's Thrush	9	2		8	7	7
Hermit Thrush	2			4	1	2
American Robin	1			2		
Red-eyed Vireo					2	
Philadelphia Vireo					1	
Warbling Vireo	1				1	
Blue-headed Vireo					1	
Tennessee Warbler	42			9	27	28
Yellow Warbler	2	1	1	4	4	3
Magnolia Warbler	6	2		7	2	8
Yellow-rumped Warbler	66	3	2	7	11	16
Black-throated Green Warbler				1	1	1
Bay-breasted Warbler				2	3	
Blackpoll Warbler					1	
Black-and-white Warbler				3	4	
American Redstart	10	3		10	21	13
Ovenbird	3			5	6	9
Northern Waterthrush	1					
Mourning Warbler	3			4		1
Common Yellowthroat					1	
Canada Warbler	5	1		3	7	4
Western Tanager				1	1	
Rose-breasted Grosbeak				1	1	3
Chipping Sparrow	4			2		5
Lincoln's Sparrow	2			1		
White-throated Sparrow	14	7	2	14	19	14
Purple Finch						1
Pine Siskin				1		
Total	191	22	5	105	139	145

## Breeding Status

Breeding status was determined through banding and observational evidence for each of the 58 species detected at the MAPS stations (Table 2). Observations were restricted to MAPS banding site visits only.

**Table 2. Breeding Status of MAPS birds in 2002.**

Species	RESI	ROAD	FEGU	FAWA	Species	RESI	ROAD	FEGU	FAWA
Common Loon	T	T	T	T	Yellow Warbler	B	B	B	B
Red-necked Grebe				T	Magnolia Warbler	B	B		L
Common Goldeneye		B	T	T	Cape May Warbler		T		
Osprey	T			T	Yellow-rump'd Warbler	B	B	B	B
Bald Eagle		T	T		Black-thrt'd Grn Warb.	B	L	L	
Ruffed Grouse	B	L			Black-and-white Warb.	B	B	B	L
Ring-billed Gull		T			American Redstart	B	B	B	B
Ruby-thrt'd Hummingbird	L				Ovenbird	B	B	B	B
Yellow-bellied Sapsucker	B	T		L	Northern Waterthrush		T	L	
Downy Woodpecker		T	T	L	Mourning Warbler	B	L	B	B
Hairy Woodpecker		T	T	L	Common Yellowthroat	L		B	L
Northern Flicker	L	T	L		Canada Warbler	B	B	B	B
Pileated Warbler	L	B		L	Western Tanager	B	L	L	L
Alder Flycatcher		L	L		Chipping Sparrow	L	L		
Least Flycatcher	B	L	B	B	Clay-colored Sparrow	L		T	
Eastern Phoebe		B	B		Song Sparrow	T	B	T	
Warbling Vireo	B			T	Lincoln's Sparrow	B			
Red-eyed Vireo	B	B	B	B	White-thrt'd Sparrow	B	B	B	B
Blue Jay	L				Dark-eyed Junco	T			
Gray Jay				T	Rose-breast'd Grosbeak	L	L	L	L
American Crow		T		T	Red-winged Blackbird				
Common Raven	B	T	L	T	Brown-headed Cowbird	L			
American Magpie	T				Purple Finch				
Black-capped Chickadee	B	B	L	L	White-winged Crossbill	T			T
Red-breasted Nuthatch	L	B		L	Pine Siskin	T	T	T	
White-breasted Nuthatch				T	Evening Grosbeak				T
Brown Creeper	B	L							
Winter Wren	B	B	B	B					
Ruby-crowned Kinglet	L	L		T					
Swainson's Thrush	B	B	B	B	Total sp. Breeder (B)	24	19	15	12
Hermit Thrush	L			L	Total sp. Likely (L)	12	11	10	14
American Robin	B	L	L	L	Total sp. Transient (T)	7	12	8	12
Cedar Waxwing	B	B	L	L					
Tennessee Warbler	B	B	B	B	Total sp.	41	42	33	38

### Productivity

LSLBO MAPS stations have contributed to productivity estimates for 7 species in the recently published reports for 1997 and 1998. However, several of the most common species captured at the LSLBO stations are not included in the Alaska and Boreal Canada Regions. Hopefully, as more stations are established in the Boreal Canada region, more species can be used by MAPS analysts. For productivity analyses described here, the number of young birds captured (HY) was divided by the number of known aged birds (HY and AHY combined). Data from the three stations were pooled. Only species that had at least one capture during each year of MAPS operation were used for the analysis (Table 3). The methodology is not as rigorous as the used by MAPS organizers and the results are quite preliminary but informative. The 2002 productivity estimates are consistent with those of 2001 for most species. Of the ten species examined, four had higher productivity rates and five had lower productivity rates than 2001. Differences for most were small and the sample size probably does not make these differences significant. Of note is the continued high productivity of Tennessee Warblers. This high productivity noted last year seems to have led to an increase in breeding birds. Thirteen adult Tennessee Warblers were caught at the MAPS stations in 2002, up from eight in 2001. Spruce Budworm activity in northern Alberta was considerable in 2002 which suggests that Tennessee Warbler numbers could remain high for the next few years.

**Table 3. Comparison of productivity (number of HY birds divided by the number of known aged birds) of the 10 most commonly captured species at the three MAPS sites in Lesser Slave Lake Provincial Park, 2003 and the 1994 - 2002 average.**

Species	AHY	HY	HY Ratio	HY Ratio	Average HY Ratio
	2003	2003	2003	2002	1994 - 2002
American Redstart	67	22	0.25	0.33	0.34
White-throated Sparrow	52	9	0.15	0	0.20
Canada Warbler	57	18	.24	0.18	0.27
Swainson's Thrush	22	13	0.37	0.33	0.29
Tennessee Warbler	8	64	0.89	0.68	0.68
Mourning Warbler	11	1	0.08	0	0.23
Myrtle Warbler	15	84	0.85	0.26	0.38
Magnolia Warbler	14	18	0.36	0.30	0.31
Ovenbird	19	16	0.46	0.30	0.24
Black-and-white Warbler	6	5	0.45	0	0.40

## Returns and Survivorship

The 2003 season marks the fifth consecutive year of coverage in which at least three periods during the early part of the season were in operation for the ROAD and FAWA stations and the fourth year of coverage for the RESI station. These three stations meet the MAPS minimum requirement of four consecutive years of operation for survivorship analyses. MAPS biologists now have the ability to include stations with interrupted years of operation in their survivorship analyses which was one of the main reasons Fern Gulley was re-activated as opposed to starting up another new station. Survivorship estimates of LSLBO data have not yet been published by MAPS organizers but nearly all of the top ten species captured at LSLBO are likely to contribute to analyses. There were 156 recapture records at MAPS stations in 2003 but the vast majority of those were of birds banded at the stations in that year or of birds banded at the migration monitoring station (Table 4). Relatively few birds returned from previous years. LSLBO data were pooled and examined for inter-year return rates which can give us an index of survivorship (Table 5). Fern Gulley was not included in our preliminary analyses because of the gap in years since it was last operated and only the most commonly captured species—those having at least one capture every year were examined. From 1995 - 2003, returns of birds banded in the preceding year accounted for 55% of inter-year recaptures at LSLBO. White-throated Sparrows, Swainson's Thrushes, Canada Warblers and American Redstarts showed the highest return rates. An American Redstart and a Canada Warbler originally banded in 2000 were 4 years old and at least five years old respectively when captured in 2003. Despite not being used in our analyses, there were several interesting recoveries at FEGU including a White-throated Sparrow banded at the station in 1999.

**Table 4. Recaptured birds at MAPS stations in 2003 and the original season of banding.**

Species	2003		2002			2001			2000			1999		
	Spr	Fall	Spr	MAPS	Fall	Spr	MAPS	Fall	Spr	MAPS	Fall	Spr	MAPS	Fall
Least Flycatcher				1										
Red-eyed Vireo					1									
Black-capped Chickadee					1				1					
Ruby-crowned Kinglet	1													
Swainson's Thrush	4	1	1			1	1							
Tennessee Warbler		1												
Yellow Warbler				1										
Magnolia Warbler	1	1				1	2							
Yellow-rumped Warbler	3	1	1			1								
Black-and-White Warbler	1	2	1		1									
American Redstart	3	1		1	4	3	1	3		2	1			1
Ovenbird	3	2	1	2										
Northern Waterthrush	1													
Canada Warbler	1	1	3	1	1			1		2		1		
Chipping Sparrow	1		1											
White-throated Sparrow	2		1	2	1	2	1						1	

**Table 5. Annual return rates for the most commonly captured MAPS species at LSLBO.**

Species	2003	2002	2001	2000	1999	1998	1997	1996	1995	95 - 03 Average
American Redstart	0.23	0.11	0	0	0.14	0.4	0.28	0.45	0.21	0.20 ∇ 0.16
White-throated Sparrow	0.14	0.13	0.33	0.13	0.06	0	0.25	0.28	0.04	0.15 ∇ 0.11
Canada Warbler	0.13	0.36	0.4	0.18	0.14	0.12	0.19	0.36	0.6	0.28 ∇ 0.16
Tennessee Warbler	0	0	0	0	0	0	0	0	0	0
Ovenbird	0	0	0.08	0.2	0.17	0	0	0	0	0.05 ∇ 0.08
Swainson's Thrush	0.14	0.40	0.25	0.13	0.38	0	0	0.5	0.22	0.22 ∇ 0.18
Yellow-rumped Warbler	0.09	0	0.5	0	0	0.12	0	0	0	0.08 ∇ 0.16
Mourning Warbler	0	0.5	0	0.33	0.25	0.08	0.33	0.5	0.07	0.23 ∇ 0.20
Magnolia Warbler	0	0.67	0.25	0.4	0.23	0	0.17	0	0	0.19 ∇ 0.23
Least Flycatcher	0.2	0	0	0	0	0	0	0	0	0.02 ∇ 0.07

## RECAPTURES

Four hundred and eighty recapture records were collected in 2003. The majority of recaptures were recorded in the spring migration and MAPS field seasons and most recaptured birds were originally banded within the same season. Ninety-three recapture records were from birds banded in 2002. Birds originally banded in 2001 or before are listed in table 6. Resumption of banding at Fern Gulley in 2003 added many recapture records including several old birds.

**Table 6. Recapture data on birds originally banded prior to 2002 at LSLBO.**

Band Number	Species	Banding			Recapture		
		Date	Location	Age	Date	Location	Age
1980-87097	American Redstart	Jul 3 '00	FAWA	SY	Jun 12 '03	FEGU	4 years
2100-07723	American Redstart	Jun 25 '01	ROAD	SY	Aug 24 '03	MIG	3 years
2100-07745	American Redstart	Jul 3 '01	ROAD	AHY	Jun 12 '03	FAWA	4+ years
2130-37209	American Redstart	Jul 11 '99	MIG	ASY	Jul 20 '03	FEGU	6+ years
2130-38767	American Redstart	Jul 22 '00	MIG	HY	Jul 18 '03	MIG	3 years
2160-63001	American Redstart	Jul 4 '00	RESI	SY	Jun 26 '03	RESI	4 years
2220-41317	American Redstart	Jul 9 '00	MIG	AHY	Jun 12 '03	FEGU	5+ years
2230-71050	American Redstart	Aug 1 '00	MIG	HY	May 31 '03	MIG	3 years
2230-71645	American Redstart	May 21 '01	MIG	ASY	Jul 20 '03	FEGU	6+ years
2230-71813	American Redstart	Jun 1 '01	MIG	SY	Jul 1 '03	FEGU	3 years
2230-71876	American Redstart	Jun 3 '01	MIG	SY	Jun 24 '03	ROAD	3 years
2230-71917	American Redstart	Jul 14 '01	MIG	SY	May 25 '03	MIG	3 years
2230-71999	American Redstart	Jul 22 '01	MIG	AHY	Aug 2 '03	ROAD	3+ years
2230-72537	American Redstart	Aug 21 '01	MIG	AHY	Jun 12 '03	FEGU	3+ years
1671-46871	Black-capped Chickadee	May 16 '00	MIG	ASY	sep 4 '03	MIG	5+ years
1671-47675	Black-capped Chickadee	Jun 2 '00	MIG	AHY	May 1 '03	MIG	4+ years
2181-79256	Black-capped Chickadee	May 1 '01	MIG	ASY	Sep 8 '03	MIG	3+ years
1980-87085	Canada Warbler	Jun 25 '00	ROAD	ASY	Jun 11 '03	ROAD	5+ years
1980-87100	Canada Warbler	Jul 3 '00	ROAD	SY	Jul 1 '03	FEGU	4 years



2130-37110	Canada Warbler	Jun 3 '99	MIG	ASY	May 26 '03	MIG	6+ years
2230-72099	Canada Warbler	Jul 29 '01	MIG	HY	Jun 12 '03	FEGU	2 years
1641-32450	Downy Woodpecker	Jun 4 '01	MIG	TY	Jul 12 '03	MIG	4 years
1671-46350	Eastern Phoebe	May 8 '00	MIG	SY	May 20 '03	MIG	4 years
2100-07751	Magnolia Warbler	Jul 11 '01	ROAD	AHY	Jul 10 '03	FEGU	3+ years
2230-71933	Magnolia Warbler	Jul 15 '01	MIG	ASY	Jun 24 '03	ROAD	4+ years
2230-71934	Magnolia Warbler	Jul 15 '01	MIG	AHY	Aug 5 '03	FEGU	3+ years
2230-72060	Magnolia Warbler	Jul 26 '01	MIG	AHY	Jun 1 '03	MIG	3+ years
2151-45456	Red-eyed Vireo	Jul 27 '95	FAWA	HY	Aug 3 '03	MIG	8 years
3121-31940	Red-eyed Vireo	Jun 12 '01	MIG	ASY	Aug 6 '03	MIG	4+ years
1451-90549	Swainson's Thrush	Jun 15 '01	RESI	ASY	Jun 26 '03	RESI	4+ years
1461-11397	Swainson's Thrush	May 24 '01	MIG	SY	May 21 '03	MIG	3 years
1641-32490	Swainson's Thrush	Jul 23 '01	MIG	ASY	May 22 '03	MIG	4+ years
1451-87993	White-throated Sparrow	Jun 17 '99	FEGU	SY	Jun 24 '03	FEGU	5 years
1451-90563	White-throated Sparrow	Jun 26 '01	RESI	AHY	Jun 26 '03	RESI	3+ years
1461-11393	White-throated Sparrow	May 24 '01	MIG	ASY	Jun 12 '03	FEGU	4+ years
1641-32451	White-throated Sparrow	Jun 5 '01	MIG	ASY	May 11 '03	MIG	4+ years
2160-64442	Yellow Warbler	Jun 7 '99	MIG	SY	May 23 '03	MIG	5 years

## COVERAGE

Coverage at the migration monitoring station in 2003 was very good and consistent with that of previous years (Table 7a & 7b). Since the revised protocol was put into effect in 2000, a high priority has been put on collecting the component data of the Daily Totals, including netting and banding, census, and visible-migration watches in as highly a standardized fashion as possible. Fifty days of coverage were accrued in spring from April 21 - June 10. Fall had 77 days of coverage from July 12 - September 30. One day of coverage was lost in spring and four days of coverage were lost in September due to a lack of qualified personnel. Net-hours were down somewhat in spring 2003 as a result of cold morning temperatures delaying net opening and net lanes 6 and 11, the two net lanes closest to the lake were closed most of the spring due to flooding from spring run-off. A trench was dug to divert water away from the nets in the fall. Fall average daily net-hours were considerably higher due to more clement weather but some hours of netting were lost in the latter part of the season due to cold morning temperatures normally experienced at that time of the year.

A total of 335 person-days were accumulated during the 2003 migration monitoring and MAPS seasons. The number of volunteer days was higher than in recent years due to the commitment of two long-term volunteers, Moshe Marvit and Danielle Skoncey, who spent almost four months helping the observatory run its field operations and many other facets as well. The observatory had a very good response from potential volunteers with nearly 20 inquiries and applications received. A tremendous debt of gratitude owed to all the volunteers who participated in LSLBO operations in 2003 (Table 8). Thank you for all your efforts.

**Table 7a. Summary of effort during spring migration monitoring at LSLBO, 2000 - 2003.**

<b>SPRING</b>	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
<b>Coverage</b>										
First day	15-May	28-Apr	04-May	30-Apr	04-May	26-Apr	18-Apr	16-Apr	19-Apr	21-Apr
Last day	09-Jun	09-Jun	07-Jun	17-Jun	09-Jun	12-Jun	13-Jun	11-Jun	11-Jun	10-Jun
# of days	19	39	28	37	36	46	57	57	54	50
Person-days	40	92	62	67	72	N/A	126	130	125	124
<b>Banding<sup>1</sup></b>										
First day	22-May	30-Apr	06-May	01-May	04-May	29-Apr	20-Apr	16-Apr	20-Apr	21-Apr
Last day	08-Jun	09-Jun	07-Jun	17-Jun	09-Jun	12-Jun	13-Jun	11-Jun	11-Jun	10-Jun
# of days	15	35	25	34	36	42	52	54	45	39
Av daily net-hrs.	37.2	65.5	62.1	58.6	74.5	69.1	62	72.9	63	48.9
<b>Census</b>										
First day	17-May	29-Apr	04-May	30-Apr	04-May	27-Apr	18-Apr	16-Apr	19-Apr	21-Apr
Last day	09-Jun	09-Jun	07-Jun	14-Jun	09-Jun	12-Jun	13-Jun	11-Jun	11-Jun	10-Jun
# of days	13	35	27	34	32	34	55	57	54	50
<b>Vis-Migs<sup>2</sup></b>										
First day		04-May	06-May	30-Apr	05-May	27-Apr	18-Apr	16-Apr	19-Apr	21-Apr
Last day		08-Jun	07-Jun	14-Jun	21-May	25-May	13-Jun	11-Jun	11-Jun	10-Jun
# of days		22	26	33	8	16	57	57	54	50
Av daily Vis-migs		2.8	3.7	4.5	3.8	N/A	8.2	7.8	8.4	8.0

<sup>1</sup> - Protocol changes in 2000 included increasing the six-hour standard banding period to seven hours

<sup>2</sup> - Starting in fall 1999 Vis-Migs were reduced from 10 minutes to five minutes

**Table 7b. Summary of effort during fall migration monitoring at LSLBO, 2000 - 2003.**

<b>FALL</b>	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
<b>Coverage</b>										
First day	27-Jul	17-Jul	27-Jul	05-Aug	14-Jul	10-Jul	07-Jul	14 -Jul	13 - Jul	12 - Jul
Last day	11-Sep	24-Sep	29-Sep	26-Sep	24-Sep	25-Sep	06-Oct	22- Sep	4 - Oct	30 - Sep
# of days	31	51	41	35	66	78	91	69	84	77
Person-days	62	116	76	45	126	N/A	207	192	173	158
<b>Banding<sup>1</sup></b>										
First day	27-Jul	17-Jul	27-Jul	06-Aug	14-Jul	10-Jul	07-Jul	14 - Jul	14 - Jul	12 - Jul
Last day	11-Sep	24-Sep	29-Sep	26-Sep	24-Sep	25-Sep	06-Oct	22- Sep	4 - Oct	30 - Sep
Number of days	30	50	35	33	62	76	89	69	78	69
Av. daily net-hrs.	35.7	50.5	40.1	60.9	48.5	56.7	74	74.6	62.9	73.8
<b>Census</b>										
First day	02-Aug	17-Jul	27-Jul	06-Aug	19-Jul	10-Jul	07-Jul	14 -Jul	13 - Jul	12 - Jul
Last day	11-Sep	23-Sep	29-Sep	03-Sep	24-Aug	08-Aug	06-Oct	22- Sep	4 - Oct	30 - Sep
# of days	18	43	39	8	10	15	90	69	84	77
<b>Vis-Mig<sup>2</sup></b>										
First day	16-Aug	28-Jul	30-Jul	06-Aug	25-Jul	13-Jul	07-Jul	14 -Jul	13 - Jul	12 - Jul
Last day	28-Aug	31-Aug	29-Sep	26-Sep	02-Sep	25-Sep	06-Oct	22 -Sep	4 - Oct	30 - Sep
Number of days	8	18	28	29	20	43	91	69	84	77
Av. daily Vis-migs	N/A	2.7	3.3	1.7	2.8	3.9	7.7	7.9	7.7	7.6

<sup>1</sup> - Protocol changes in 2000 included increasing the six-hour standard banding period to seven hours

<sup>2</sup> - Starting in fall 1999 Vis-Migs were reduced from 10 minutes to five minutes



**Table 8. Person-days at LSLBO in 2003.**

<b>Staff</b>	<b>Spring</b>	<b>MAPS</b>	<b>Fall</b>	<b>Total</b>
Jul Wojnowski	35	9	57	101
Tyler Flockhart	33	14	33	80
Bryn Jonzon	2		3	5
<b>Total Staff-days</b>	<b>70</b>	<b>23</b>	<b>93</b>	<b>186</b>
<b>Volunteers</b>				
Debra Belmonte			3	3
Hanneke Brooymans			3	3
Cindy Cartwright			2	2
Marie-Helene Gendron	1		1	2
Stefan Jungkind			7	7
Albin Jungkind			2	2
Kendra Jungkind			2	2
Tyler Kilmury	2			2
Aaron Lehman	2			2
Chelsea Martin			3	3
Moshe Marvit	21	15	21	57
Albert Miller	1			1
Junita Mumby	1			1
Sabrina Popp			6	6
Lisa Priestley	1		1	2
Chuck Priestley	1		1	2
Danielle Skoncey	22	15	33	70
Bryn Spence	1			1
Amy Watton	2			2
<b>Total Volunteer-days</b>	<b>54</b>	<b>30</b>	<b>65</b>	<b>149</b>

## VISITORS AND EDUCATION

Nearly 1,000 visitors came to LSLBO in 2003 (Table 9) which is about average for recent years. LSLBO organized activities like the Songbird Festival in June and IBA day in August brought about 250 visitors to the observatory who learned about banding and conservation issues facing migrants. A beautiful summer brought higher than average numbers of visitors to Lesser Slave Lake Provincial Park resulting in higher walk-in traffic during the summer. Organised groups included several school groups, Junior Forest Wardens, and organised tours.

**Table 9. Number of visitors to the LSLBO banding station in 2003.**

Season	Adults	Children	Age not recorded	# of groups	Total Visitors
Spring (Apr 21 - Jun 10)	162	42	150	3	354
Summer & Fall ( Jun 11 - Sep 30)	400	203		3	603
<b>Total</b>	<b>562</b>	<b>245</b>	<b>150</b>	<b>6</b>	<b>957</b>

## OTHER OBSERVATORY ACTIVITIES

Several research projects were initiated or continued in LSLBO in 2003 which are extensions of the core monitoring programs.

### Canada Warbler Project

In 2003, a pilot project was initiated on the breeding ecology of Canada Warblers in Lesser Slave Lake Provincial Park. A 13.5 ha plot (200m x 650m) adjacent to the migration station and overlapping the ROAD, FEGU, and FAWA MAPS stations was laid out in a 50m x 50m grid. In addition to the standard aluminum Wildlife Service band, adult Canada Warblers were marked with a unique combination of coloured leg bands. Banding took place in the spring migration as well as through the MAPS field season. Every few days throughout the summer, spot-mapping was done on the grid to identify territory size and pairing as well as other aspects of the breeding ecology of Canada Warblers. A separate report on the pilot project will be prepared. Preliminary results are encouraging but a substantial investment on behalf of the observatory in terms of staff time (paid or volunteer) will be required. A university graduate project based on the Canada Warbler study at LSLBO is being investigated.

### Moult Study

The most common moult strategy of adult passerines is to do a complete moult of body and flight feathers on the summer breeding grounds. In general, the moult usually begins prior to the young becoming independent and is nearly completed before the southward migration. As part of an on-going study on moult, primary moult scores were again collected in summer and fall at LSLBO. As in 2002, primary moult on adult birds captured in summer and fall was examined and scored according to Ginn and Melville (1983). Each primary was scored on a scale from 0 - 5 (old and unmoulted feather - completely grown new feather, respectively). Following recommendations from the 2002 report a more diligent effort was made to collect information which was rewarded with the collection of 343 moult records collected from July 2 to September 24 (Appendix 3). The majority of adult birds are caught in the early part of the fall season and consequently most moult records are collected in July through mid August (Table 10). Sixty percent of moult records are collected in July making it a critical period for collecting the information. The most common species with moult records collected were American Redstart (74), Yellow-rumped Warbler (61), Canada Warbler (25), and Swainson's Thrush (23).

**Table 10. Fall captures at LSLBO 2000 - 2003.**

	Jul 1 - 14	Jul 15 - 31	Aug 1 - 14	Aug 15 - 31	Sep 1 - 14	Sep 15 - 30
Tot. captures	787	3494	3185	2894	1572	938
% Adult	74.5	18.6	7.4	4.9	4.6	20.9

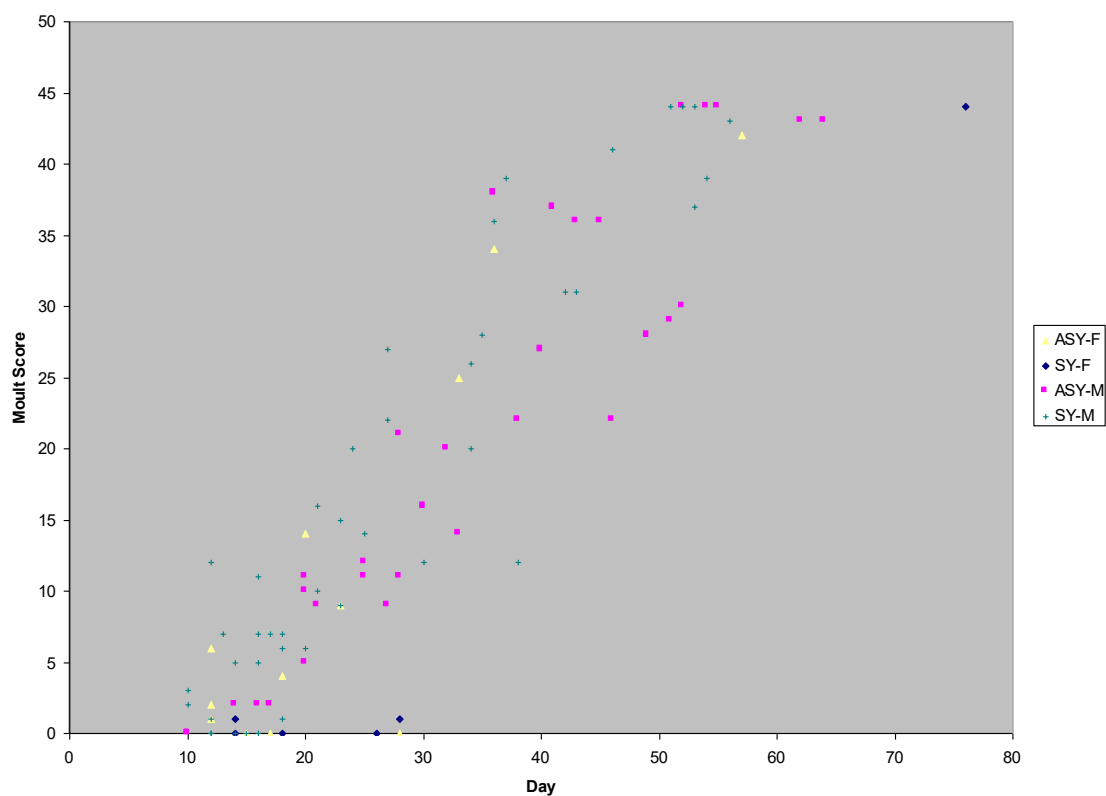
Preliminary results based on primary moult scores collected from 2000 - 2003 have yielded some interesting results which we hope to expand on with more years of data. Several facets of moult to be explored include age and sex related differences in timing of moult, differential timing and rate of moult in different species. American Redstarts are an excellent species for age/sex differential moult timing as most individuals, particularly males can be easily assigned a highly specific age class. American Redstarts also have the most records collected at LSLBO.

According to the literature, second-year males are the first to start moulting, followed by after second-year males. Preliminary results based on LSLBO moult records seem to support this (fig 1.). It is not entirely clear why younger males should moult first but quite possibly these early moulting birds are unsuccessful or failed breeders.

Based on data from recaptured birds at LSLBO, moult completion advances by about 2 % per day on average for most species. Yellow-rumped Warblers have a slower rate (1.84%/day) and Canada Warblers the fastest rate at 2.31%/day (Table 11). The sample size is relatively slow and may not be statistically significant but is what we would expect for a late migrant (Yellow-rumped Warbler) that may have more time available before it migrates south than and an early migrant (Canada Warbler).

**Table 11. Moulting completion and daily increase in selected warbler species at LSLBO.**

	AMRE	BAWW	CAWA	MYWA
Earliest moult date	10-Jul - 6%	12-Jul - 11%	2-Jul - 9%	12-Jul - 7%
Latest moult date	19-Sep - 93%	12-Aug - 71%	29-Aug - 3%	24-Sep - 98%
% daily increase in moult	1.96	2.22	2.31	1.84



**Figure 1.** Differential moult timing in American Redstarts at LSLBO. Day 1 = July 1

### MAPS season extension

As recommended in the 2002 report, banding at the MAPS stations was extended through August. The extension of the MAPS banding was done for several reasons. It was hoped that additional weekly run stations could work as satellite banding operations of the migration monitoring station and corroborate its results. Also, banding in the forest interior could shed some light on the migration of adult birds which seem to avoid the migration monitoring station located along the shore of Lesser Slave Lake. Thirdly, it was viewed as an opportunity to collect additional moult data.



Due to their proximity to the migration monitoring station, the Fern Gulley and Road Side stations were chosen for three additional visits from Aug 14 - 30 after the MAPS season was over. Six to nine nets were operated at each station for up to 6 hours. Nets located in close proximity to the forest edge were not operated. Migration nets were operated simultaneously on all days after season start on July 12.

Capture rates at the MAPS nets were much lower than at the migration nets even on same day of operation (Table 12). However, a substantially higher proportion of adult birds were caught at the MAPS nets. Eleven of 37 (29.7%) capture records at the MAPS stations from Aug 14 - 30 were adult birds consisting of 10 individuals including two residents (Black-capped Chickadee). The remaining birds—migrants—were Swainson's Thrush (4), American Restart (2) Canada Warbler (1) and White-throated Sparrow (1). All birds except the sparrow (a late migrating temperate migrant) had nearly completed their flight feather moult. Flight feather moult was in similar stages for neotropical migrants caught at the migration station during the same period (Aug 14 - 30) but only 5.5% of the captures were of adult birds. Preliminary results seem to suggest that adults may shy away from open edge habitat during migration but further investigation is necessary.

**Table 12. Captures at MAPS and Migration Monitoring stations in 2003.**

		10-Jul	12-Jul	20-Jul	23-Jul	02-Aug	05-Aug	14-Aug	15-Aug	23-Aug	24-Aug	29-Aug	30-Aug
	net-hours		49	59.6	84	84	38.2	84	84	60	68.6	83.5	84
Migration	birds/n-hr		0.84	3.27	1.26	0.881	0.497	0.179	0.274	0.067	0.058	1.21	0.619
	adult ratio		0.51	0.06	0.05	0.027	0.211	0.067	0.087	0.5	0.25	0.02	0.019
	net-hours		60		60	60		54		33.7		48	
ROAD	birds/n-hr		0.22		0.28	0.783		0.111		0.059		0.271	
	adult ratio		0.77		0.29	0.106		0.167		0		0.385	
	net-hours	60		60			44.7		35		42		42
FEGU	birds/n-hr	0.27		0.48			1.275		0.229		0.024		0.167
	adult ratio	0.81		0.41			0.263		0.087		1		0.143

## RECOMMENDATIONS

In recent years LSLBO has made an effort to increase the research component of its activities. Many of these research projects are expansions of core monitoring programs which reduces costs considerably. The largest obstacle facing the observatory in carrying out and expanding on the growing list of research projects is a lack of personnel. Whether paid or volunteer, additional help is required for continued operation of LSLBOs' programs. Capacity was reached in terms of work load for the personnel available. While overall coverage for core monitoring programs was good in 2003, migration monitoring did suffer a bit in September as four days of coverage were lost due to a lack of personnel. A shorter contract for the field assistant was partly responsible but there was also very limited volunteer help in September. For the first time LSLBO operated four MAPS stations during the breeding season. With the current staffing this is probably the limit of LSLBO's contribution to the program and additional MAPS sites are not recommended at this time. Extended banding at MAPS stations through the fall has yielded interesting results and is a worthwhile pursuit for the next few years. Fall banding at MAPS or other sites further inland and away from the shoreline may shed some light on migration route differences between adults and hatching-year birds, however, banding at sites more than once weekly may be required to demonstrate if differences are statistically significant. Banding further into the fall season—maybe to mid September—may also be worthwhile. Both options will require more personnel, paid or volunteer to be on hand later into the season than was available in 2003.

Core and research programs would benefit tremendously from the help of a second field assistant, particularly the Canada Warbler Project which is the most labour intensive. Several avenues could be explored to help offset some of these costs. Proposals should be made and submitted to industry for additional funding. LSLBO should also seek to attract a graduate student for a project that would meet goals of the organization. Local job creation programs targeting high school students or the native community should be explored.

Increasing the volunteer component would also be extremely beneficial. While a tremendous volunteer response was received in 2003—the highlight being the commitment of two long-term volunteers committing to four months each—there was a shortage of help in the late fall. In future, a higher priority should be given to experienced volunteers who can commit to help into late September. Unfortunately, LSLBO was not able to take advantage of the offered volunteer due to a lack of suitable housing. Addressing the accommodations situation should be a high priority for LSLBO. If a lack of available housing continues to be an issue LSLBO should investigate opportunities to increase the level of local volunteer support. In the past LSLBO has made every effort to accept and accommodate local volunteer in order to increase the local pool of helpers but more aggressive soliciting of local volunteers may be needed. Possible communities to actively try to recruit include seniors, high school students and the aboriginal community.

In a few short years LSLBO has done a tremendous amount of moult data collection with preliminary results very promising and worth further investigation. In order to more accurately pinpoint the start of moult, it is recommended that primary moult should be recorded on all adult birds caught starting July 1 of every year. A core group of priority species should be selected for which all banders and volunteers will be instructed to collect moult data as part of minimum data

recorded when there is a high volume of birds needing to be processed quickly. Moulting studies such as the one at LSLBO lend themselves well to collaborative research projects with other stations and this option should be investigated.

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Watton.

## APPENDICES

## **APPENDIX I. Species arrival and departure dates and maxima at LSLBO in 2003.**

The following list includes seasonal first and last dates and maximum total (in bold) for each species in Spring (April 21 - June 10) and Fall (July 12 - September 30) encountered in 2003. Unless otherwise stated, all sightings are from the migration monitoring station in Lesser Slave Lake Provincial Park.

**Red-throated Loon:** May 27 - 4; 1<sup>st</sup> record for the Slave Lake area  
**Common Loon:** S: May 2 - 1; Jun 10 - 3; **80** - May 27; F: Jul 12 - 2; Sep 24 - 1; **40** - Aug 13  
**Pied-billed Grebe:** S: Apr 28 - 1;  
**Red-necked Grebe:** S: May 9 - 1; Jun 10 - 2; **2** - several dates; F: Jul 13 - 2; Sep 22 - 1; **6** - Aug 16  
**Horned Grebe:** F: Jul 12 - 2; Sep 29 - 4; **45** - Aug 30  
**Eared Grebe:** F: Aug 27 - 2; Aug 28 - 2  
**Western Grebe:** S: Jun 7 - 2; F: Jul 12 - 1; Sep 30 - 1; **10** - Aug 30  
**American White Pelican:** S: May 25 - 2; Jun 8 - 4; **6** - Jun 5; F: Jul 12 - 1; Sep 30 - 1; **10** - Aug 24  
**Double-crested Cormorant:** S: May 9 - 1; **23** - May 29  
**Great Blue Heron:** S: May 22 - 1; May 28 - 1; 1 - 3 dates; F: Aug 3 - 2; Aug 29 - 1; **2** - Aug 3 & 16  
**Tundra Swan:** S: Apr 21 - **184**; Apr 29 - 4  
**White-fronted Goose:** S: Apr 29 - 159; May 10 - 1850; **2877** - May 9; F: Sep 14 - 11; Sep 17 - 2; **68** - Sep 15  
**Snow Goose:** S: May 9 - **54**; May 10 - 25; F: Sep 15 - **69**; Sep 16 - 14  
**Canada Goose:** S: Apr 21 - 4; Jun 7 - 14; **184** - May 11; F: Aug 8 - 4; Sep 30 - 20; **60** - Aug 19  
**Green-winged Teal:** S: Apr 24 - **35**; Jun 10 - 1; F: Aug 6 - 4; Sep 17 - 4  
**Mallard:** S: Apr 21 - 8; Jun 10 - 9; **18** - Apr 28; F: Jul 12 - 2; Sep 30 - 10; **25** - Aug 27 & 28  
**Northern Pintail:** S: Apr 22 - 2; May 8 - 4; **18** - May 7; F: Sep 8 - 1; Sep 25 - 1  
**Blue-winged Teal:** S: May 1 - 6; Jun 7 - 1; **15** - May 11; F: Aug 31 - 5; Sep 19 - 2  
**Northern Shoveler:** S: May 1 - 12; May 14 - 11; **13** - May 11  
**Gadwall:** S: May 8 - 6; May 14 - 4  
**American Wigeon:** S: Apr 21 - 2; Jun 9 - 1; **33** - May 11; F: Sep 6 - 1; Sep 24 - 3  
**Canvasback:** S: May 10 - 5  
**Ring-necked Duck:** S: Apr 23 - 3; May 2 - 2  
**Lesser Scaup:** S: Apr 21 - 4; Jun 6 - 10; **21** - May 13  
**Long-tailed Duck:** S: May 22 - 2; May 28 - 5; **30** - May 27  
**Surf Scoter:** S: May 11 - 56; May 30 - 2; **121** - May 12  
**White-winged Scoter:** S: May 11 - 2; May 12 - 3  
**Common Goldeneye:** S: Apr 21 - 36; Jun 10 - 12; **82** - May 23; F: Jul 12 - 6; Sep 30 - 57; **60** - Sep 29  
**Bufflehead:** S: Apr 23 - 4; Jun 9 - 1; **4** - Apr 23 & May 14; F: Aug 29 - 2; Sep 30 - 26; **33** - Sep 29  
**Common Merganser:** S: Apr 21 - 6; Jun 10 - 2; **80** - May 27; F: Jul 13 - 2; Sep 30 - 2; **40** - Aug 3 & 7  
**Red-breasted Merganser:** S: Apr 24 - 3; Jun 6 - 6; **16** - Apr 29  
**Osprey:** S: May 2 - 1; Jun 8 - 1; **2** - May 11 & Jun 2; F: Jul 14 - 1; Sep 18 - 1; **3** - Jul 16 & Aug 26  
**Bald Eagle:** S: Apr 21 - 1; Jun 8 - 2; **5** - May 15; F: Jul 12 - 2; Sep 30 - 1; **12** - Sep 11  
**Northern Harrier:** S: Apr 21 - 1; May 30 - 1; **6** - Apr 22; F: Jul 20 - 1; Sep 22 - 1; **5** - Aug 20 & Sep 7  
**Sharp-shinned Hawk:** S: Apr 21 - 2; May 24 - 1; **4** - May 19; F: Jul 22 - 1; Sep 29 - 2; **32** - Aug 30  
**Cooper's Hawk:** F: Aug 27 - 1  
**Northern Goshawk:** F: Aug 20 - 1  
**Broad-winged Hawk:** S: May 11 - 2; Jun 7 - 1; F: Sep 4 - 1  
**Red-tailed Hawk:** S: May 3 - 1; May 18 - 1; **2** - May 15 & 16; F: Aug 31 - 1; Sep 20 - 1  
**Rough-legged Hawk:** S: Apr 28 - 1; May 4 - 1; 1 - 2 dates  
**American Kestrel:** S: Apr 29 - 2; Apr 30 - 1; F: Aug 7 - 1; Sep 24 - 1; **4** - Sep 6  
**Merlin:** S: Apr 21 - 2; May 25 - 1; **2** - Apr 29 & May 9; F: Jul 13 - 1; Sep 29 - 1; **3** - Aug 4

**Peregrine Falcon:** S: Apr 26 - 1; May 24 - 1; **1** - 4 dates  
**Ruffed Grouse:** S: Apr 21 - **3**; Jun 10 - 1; **3** - 3 dates: F: Aug 4 - **3**; Sep 30 - 1  
**Sandhill Crane:** S: Apr 24 - 20; May 16 - 1; **290** - May 3: F: Sep 6 - 10; Sep 17 - 60; **280** - Sep 14  
**Killdeer:** S: Apr 21 - 1; Jun 6 - 1; **2** - Apr 24  
**Greater Yellowlegs:** S: Apr 21 - 1; May 28 - 1; **16** - May 2: F: Jul 29 - 1; Aug 26 - 1; **4** - Aug 10  
**Lesser Yellowlegs:** S: May 10 - 2; Jun 1 - 1; **12** - May 14: F: Aug 10 - 2; Aug 29 - **15**  
**Solitary Sandpiper:** S: Apr 25 - 1; May 17 - 1; **4** - May 13: F: Aug 29 - **1**  
**Spotted Sandpiper:** S: May 10 - 1; Jun 10 - 3; **8** - May 25: F: Jul 12 - 2; Sep 2 - 1; **6** - Aug 13 & 27  
**Least Sandpiper:** S: May 23 - **18**: F: Aug 16 - **2**  
**Common Snipe:** S: Apr 29 - 1; May 21 - 1; **2** - May 5 & 17  
**Bonaparte's Gull:** S: Apr 29 - 15; May 13 - 18; **43** - May 11: F: Aug 20 - **1**  
**Franklin's Gull:** S: Apr 23 - 3; May 28 - 20; **1273** - May 9: F: Jul 12 - 2; Sep 3 - 200; **550** - Aug 24  
**Mew Gull:** S: May 9 - 9; May 19 - 2; **25** - May 12  
**Ring-billed Gull:** S: Apr 21 - 3; Jun 10 - 3; **16** - May 15: F: Jul 12 - 4; Sep 30 - 4; **140** - Jul 29  
**California Gull:** S: Apr 26 - 1; May 18 - 2; **12** - May 14: F: Aug 17 - 1; Sep 13 - 1; **4** - Sep 11 & 12  
**Herring Gull:** S: Apr 28 - 3; Jun 8 - 1; **12** - Jun 4: F: Aug 7 - 2; Sep 21 - 1; **4** - 6 dates  
**Caspian Tern:** F: Aug 1 - **1**  
**Common Tern:** S: May 14 - 3; Jun 10 - 8; **16** - May 24: F: Jul 12 - 3; Sep 24 - 3; **40** - Jul 29 & Sep 3  
**Forster's Tern:** S: May 12 - 2; Jun 4 - 1; **6** - May 30: F: Jul 21 - 1; Aug 27 - **4**  
**Black Tern:** S: May 25 - **8**: F: Jul 12 - **1**; Aug 7 - **1**  
**Mourning Dove:** S: May 4 - **1**  
**Barred Owl:** S: Apr 26 - 1; May 28 - **2**:  
**Short-eared Owl:** F: Sep 12 - **1**  
**Common Nighthawk:** F: Jul 17 - **1**  
**Ruby-throated Hummingbird:** S: May 26 - 1; May 31 - **1**: F: Jul 23 - 1; Aug 6 - 1  
**Belted Kingfisher:** S: Apr 23 - 1; May 28 - 1; **2** - May 3: F: Aug 16 - 1; Sep 6 - **1**; **1** - 4 dates  
**Yellow-bellied Sapsucker:** S: Apr 28 - 3; Jun 8 - 1; **8** - May 8: F: Jul 13 - **4**; Sep 7 - 1  
**Downy Woodpecker:** S: Apr 23 - 1; May 28 - 1; **2** - Apr 28 & May 27: F: Jul 12 - 3; Sep 30 - 2; **4** - Sep 19  
**Hairy Woodpecker:** S: Apr 23 - 1; May 30 - 1; **1** - several dates: F: Jul 13 - **1**; Sep 22 - **1**; **1** - 5 dates  
**Northern Flicker:** S: Apr 22 - 9; Jun 4 - 1; **15** - May 8: F: Jul 12 - 1; Sep 6 - 1; **2** - Aug 8  
**Pileated Woodpecker:** S: Apr 21 - 1; Jun 10 - **2**; **2** - several dates: F: Jul 13 - **1**; Sep 19 - **1**; **1** - many dates  
**Olive-sided Flycatcher:** S: May 27 - **1**: F: Aug 12 - 1; Aug 29 - **2**  
**Western Wood-Pewee:** S: May 24 - 1; May 31 - 1; **2** - May 30: F: Aug 6 - 1; Aug 9 - 1  
**Yellow-bellied Flycatcher:** S: Jun 2 - 1; Jun 9 - 1; **2** - Jun 5: F: Aug 10 - 1; Aug 26 - 1; **1** - 5 dates  
**Alder Flycatcher:** S: May 27 - 2; Jun 10 - 5; **6** - Jun 8: F: Jul 12 - 2; Sep 13 - 1; **17** - Aug 7  
**Least Flycatcher:** S: May 11 - 1; Jun 8 - 1; **50** - May 25: F: Jul 12 - 2; Sep 11 - 1; **12** - Jul 30  
**Eastern Phoebe:** S: Apr 23 - 1; Jun 10 - 1; **4** - several dates: F: Jul 12 - 2; Aug 26 - 3; **8** - Aug 9  
**Say's Phoebe:** S: May 13 - **6**; May 20 - 1: F: Aug 16 - 1; Aug 26 - **1**  
**Eastern Kingbird:** S: May 29 - **1**; Jun 4 - **1**; **1** - 3 dates: F: Aug 12 - 1; Aug 31 - 1; **5** - Aug 16  
**Blue-headed Vireo:** S: May 13 - 1; Jun 1 - 1; **2** - May 24: F: Jul 20 - **1**  
**Warbling Vireo:** F: Jul 21 - **1**; Aug 18 - **1**  
**Philadelphia Vireo:** S: May 30 - **1**; Jun 6 - **1**: F: Jul 31 - 1; Aug 22 - **3**  
**Red-eyed Vireo:** S: May 30 - 1; Jun 10 - 2; **5** - Jun 7: F: Jul 12 - 10; Sep 6 - 1; **10** - Jul 12 & Aug 7  
**Northern Shrike:** F: Sep 30 - **1**  
**Blue Jay:** S: Apr 21 - 1; Jun 8 - 2; **14** - May 14: F: Jul 23 - **6**; Sep 30 - 1  
**American Magpie:** S: Apr 28 - 1; Jun 6 - 1; **3** - May 23: F: Aug 14 - **50**; Sep 30 - 3  
**American Crow:** S: Apr 21 - 9; Jun 10 - 1; **55** - May 9: F: Jul 12 - 2; Sep 29 - 1; **70** - Aug 13  
**Common Raven:** S: Apr 21 - 4; Jun 10 - 1; **33** - May 8: F: Jul 12 - 5; Sep 30 - 4; **22** - Sep 29  
**Tree Swallow:** S: Apr 29 - 1; Jun 6 - 1; **36** - May 18: F: Jul 19 - 2; Jul 31 - **4**

**Bank Swallow:** S: May 16 - 31; Jun 1 - 2; **202** - May 18; F: Jul 19 - 1; Aug 30 - 1; **45** - Aug 6  
**Cliff Swallow:** S: May 29 - 1  
**Barn Swallow:** S: May 18 - 4; Jun 8 - 3; **6** - May 25; F: Jul 29 - 1; Aug 30 - 1; **3** - Aug 7  
**Black-capped Chickadee:** S: Apr 21 - **8**; Jun 10 - 2; F: Jul 12 - 8; Sep 30 - 10; **13** - Sep 24  
**Boreal Chickadee:** F: Sep 6 - 2; Sep 24 - 2; **5** - Sep 21  
**Red-breasted Nuthatch:** S: Apr 21 - 1; Jun 4 - 1; **2** - Apr 25 & May 23; F: Jul 12 - 1; Sep 30 - 2; **4** - Aug 26 & Sep 7  
**White-breasted Nuthatch:** F: Jul 23 - 1; Aug 29 - 1  
**Brown Creeper:** S: Apr 21 - 1; May 9 - 1; **2** - May 5; F: Jul 12 - 1; Sep 25 - 1  
**House Wren:** S: May 28 - 1; May 30 - 1  
**Winter Wren:** S: May 9 - 1; Jun 10 - 1; **1** - several dates; F: Jul 12 - 1; Sep 30 - 1; **1** - 5 dates  
**Ruby-crowned Kinglet:** S: Apr 21 - 1; Jun 10 - 1; **10** - May 9; F: Jul 18 - 1; Sep 30 - 1; **5** - Sep 19 & 24  
**Gray-cheeked Thrush:** S: May 9 - 1; May 27 - 1; **2** - May 8; F: Aug 29 - 1  
**Swainson's Thrush:** S: May 8 - 3; Jun 10 - 1; **39** - May 25; F: Jul 12 - 3; Sep 19 - 1; **12** - Aug 8  
**Hermit Thrush:** S: Apr 25 - 1; Jun 1 - 1; **16** - May 4; F: Jul 21 - 1; Sep 30 - 2  
**American Robin:** S: Apr 21 - 3; Jun 10 - 1; **294** - May 2; F: Jul 12 - 3; Sep 30 - 1; **5** - Jul 30  
**Varied Thrush:** S: May 3 - 4; May 4 - 1  
**European Starling:** S: Apr 22 - 2; May 27 - 2; **6** - May 12  
**American Pipit:** S: Apr 21 - 1; May 20 - 1; **66** - May 2; F: Aug 28 - 10; Sep 30 - 11; **42** - Sep 7  
**Gray Catbird:** S: May 25 - 1  
**Cedar Waxwing:** S: May 24 - 2; Jun 10 - **32**; F: Jul 12 - 4; Sep 29 - 2; **50** - Aug 26  
**Tennessee Warbler:** S: May 22 - 2; Jun 10 - 2; **15** - May 27; F: Jul 12 - 7; Sep 8 - 2; **233** - Jul 20  
**Nashville Warbler:** F: Jul 31 - 1; Aug 29 - 1  
**Orange-crowned Warbler:** S: May 1 - 3; May 21 - 1; **17** - May 3; F: Aug 14 - 1; Sep 24 - 2; **15** - Sep 19  
**Yellow Warbler:** S: May 14 - 4; Jun 10 - 4; **13** - May 25; F: Jul 12 - 10; Sep 3 - 1; **24** - Jul 16  
**Magnolia Warbler:** S: May 25 - 2; Jun 10 - 1; **4** - May 31; F: Jul 12 - 2; Sep 19 - 2; **6** - Aug 29  
**Cape May Warbler:** F: Jul 31 - 1; Sep 2 - 1; **2** - Aug 15  
**Yellow-rumped Warbler:** S: Apr 22 - 11; Jun 10 - 1; **799** - May 13; F: Jul 12 - 14; Sep 30 - 6; **2208** - Aug 30  
**Black-throated Green Warbler:** S: May 10 - 1; Jun 10 - 1; **2** - May 24; F: Jul 12 - 1; Aug 14 - 1; **2** - Jul 26  
**Palm Warbler:** S: May 2 - 1; May 25 - 1; **3** - May 11 & 18; F: Jul 20 - 2; **4** - Sep 24  
**Bay-breasted Warbler:** F: Jul 29 - 1; Aug 26 - 1; **1** - 5 dates  
**Blackpoll Warbler:** S: May 27 - 1; F: Jul 20 - 2; Aug 27 - 1  
**Black-and-white Warbler:** S: May 9 - 4; Jun 10 - 1; **6** - May 24 & 25; F: Jul 12 - 1; Sep 7 - 1; **10** - Jul 20  
**American Redstart:** S: May 13 - 1; Jun 10 - 6; **76** - May 25; F: Jul 12 - 12; Sep 19 - 1; **33** - Jul 25  
**Ovenbird:** S: May 11 - 1; Jun 10 - 3; **15** - May 25; F: Jul 12 - 3; Sep 3 - 1; **12** - Jul 31  
**Northern Waterthrush:** S: May 8 - 1; Jun 10 - 1; **3** - 3 dates; F: Jul 15 - 1; Aug 29 - 1; **7** - Aug 9  
**Connecticut Warbler:** S: Jun 9 - 1  
**Mourning Warbler:** S: May 25 - 3; Jun 10 - 1; F: Jul 12 - 1; Sep 2 - 3; **4** - Aug 12 & 13  
**Common Yellowthroat:** S: May 22 - 2; Jun 10 - 2; **5** - May 25, 26, & 27; F: Jul 12 - 3; Sep 16 - 1; **4** - Jul 13  
**Wilson's Warbler:** S: May 25 - 3; Jun 9 - 1; F: Aug 7 - 1; Sep 12 - 1; **3** - Aug 11  
**Canada Warbler:** S: May 25 - 1; Jun 10 - 3; **11** - Jun 2; F: Jul 12 - 1; Aug 28 - 1; **15** - Aug 2  
**Western Tanager:** S: May 21 - 1; Jun 10 - 1; **1** - several dates; F: Jul 12 - 1; Sep 7 - 1; **16** - Aug 18  
**American Tree Sparrow:** S: Apr 22 - 7; May 3 - 1; **7** - Apr 22; F: Sep 20 - 2  
**Chipping Sparrow:** May 10 - 1; Jun 10 - 1; **930** - May 25; F: Jul 12 - 2; Aug 18 - 3; **37** - Aug 7  
**Clay-colored Sparrow:** S: May 12 - 2; Jun 10 - 1; **19** - May 25; F: Jul 14 - 2; Sep 4 - 1; **4** - Aug 16  
**Vesper Sparrow:** S: May 9 - 1  
**Savannah Sparrow:** S: Apr 26 - 6; May 19 - 1; F: Jul 22 - 1; Sep 10 - 1; **1** - 5 dates  
**Le Conte's Sparrow:** S: May 13 - 1; May 21 - 1  
**Fox Sparrow:** S: Apr 28 - 1; May 8 - 1; **24** - May 4; F: Sep 17 - 1  
**Song Sparrow:** S: Apr 21 - 3; Jun 10 - 2; **6** - May 23; F: Jul 12 - 4; Aug 28 - 1; **7** - Jul 29



**Lincoln's Sparrow:** S: May 3 - 6; Jun 9 - 2; F: Jul 12 - 1; Sep 30 - 1; 8 - Jul 23  
**Swamp Sparrow:** S: May 4 - 1; May 23 - 1; 1 - several dates  
**White-throated Sparrow:** S: May 2 - 2; Jun 10 - 3; 20 - 3 dates; F: Jul 12 - 6; Sep 30 - 2; 7 - Sep 2 & 3  
**White-crowned Sparrow:** S: May 2 - 4; May 27 - 1; 22 - May 3; F: Aug 26 - 3; Sep 24 - 1; 5 - Sep 9  
**Harris's Sparrow:** S: May 21 - 1  
**Dark-eyed Junco:** S: Apr 21 - 9; May 22 - 1; 75 - Apr 25; F: Sep 10 - 4; Sep 30 - 3  
**Lapland Longspur:** S: Apr 22 - 5; May 2 - 13; F: Sep 2 - 2; Sep 30 - 2; 60 - Sep 7  
**Snow Bunting:** S: Apr 21 - 1; May 3 - 20  
**Rose-breasted Grosbeak:** S: May 11 - 1; Jun 10 - 1; 16 - May 25; F: Jul 14 - 1; Sep 6 - 1; 8 - Jul 30 & Aug 8  
**Red-winged Blackbird:** S: Apr 21 - 13; Jun 10 - 1; 222 - May 14; F: Jul 19 - 4; Sep 3 - 2; 61 - Aug 9  
**Yellow-headed Blackbird:** S: Apr May 13 - 13; May 29 - 2  
**Rusty Blackbird:** S: Apr 22 - 84; Jun 1 - 1; F: Sep 24 - 17; Sep 30 - 12  
**Brewer's Blackbird:** S: Apr 22 - 30  
**Common Grackle:** S: Apr 22 - 30; May 25 - 9; F: Aug 12 - 2; Aug 30 - 5  
**Brown-headed Cowbird:** S: May 3 - 3; Jun 6 - 1; 40 - May 14  
**Baltimore Oriole:** S: May 22 - 1; May 28 - 1; 8 - May 25; F: Jul 20 - 1; Jul 29 - 1  
**Purple Finch:** S: Apr 21 - 5; Jun 6 - 2; 8 - Apr 22; F: Jul 20 - 2; Sep 30 - 1; 35 - Aug 16  
**White-winged Crossbill:** F: Jul 12 - 6; Sep 30 - 28; 35 - Aug 14  
**Red Crossbill:** F: Aug 16 - 9; Aug 18 - 3  
**Pine Siskin:** S: Apr 23 - 2; Jun 10 - 2; 16 - May 9; F: Jul 12 - 2; Sep 30 - 7; 352 - Sep 24  
**American Goldfinch:** S: May 28 - 1; Jun 4 - 1; 1 - 3 dates; F: Jul 12 - 1; Aug 31 - 1; 1 - 6 dates  
**Evening Grosbeak:** S: Apr 21 - 12; Jun 10 - 2; F: Jul 13 - 1; Sep 30 - 3; 43 - Aug 15

## Appendix II. Banding Totals at LSLBO in 2003.

Species	Spring Migration	MAPS	Fall Migration	Other	Total
Yellow-rumped Warbler	49	88	711		848
Tennessee Warbler	16	69	534	2	621
American Redstart	70	52	208		330
Swainson's Thrush	99	22	124	7	252
Yellow Warbler	12	5	151		168
Canada Warbler	27	44	80	2	153
Ovenbird	23	23	102	4	152
Least Flycatcher	78	8	64		150
White-throated Sparrow	53	35	27	1	116
Black-and-white Warbler	23	5	71		99
Alder Flycatcher	12		61	1	74
Orange-crowned Warbler	7		48	1	56
Magnolia Warbler	8	12	32	2	54
Lincoln's Sparrow	18	3	31		52
Mourning Warbler	10	10	28	2	50
Black-capped Chickadee	3	7	36	1	47
Northern Waterthrush	12	2	29		43
Red-eyed Vireo	6	3	32		41
Chipping Sparrow	18	6	13		37
Clay-colored Sparrow	22		14		36
Ruby-crowned Kinglet	20	3	13		36
Common Yellowthroat	17		14		31
Dark-eyed Junco	18		6		24
Sharp-shinned Hawk	4		20		24
Song Sparrow	6		14		20
White-crowned Sparrow	6		12		18
Wilson's Warbler	3		15		18
Western Tanager		2	14		16
Hermit Thrush	3	4	6		13
Rose-breasted Grosbeak	1		11		12
American Robin	7	2	3		12
Yellow-bellied Sapsucker	5	4	3		12
Palm Warbler	4		7		11
Blackpoll Warbler	1		9		10
Yellow-bellied Flycatcher	5		5		10
Cape May Warbler		1	9		10
American Tree Sparrow	6		2		8
Downy Woodpecker		1	7		8
Gray-cheeked Thrush	6		1		7
Pine Siskin	1		6		7
Black-throated Green Warbler		1	6		7

Red-breasted Nuthatch		2	5		7
Eastern Phoebe	3		3		6
Cedar Waxwing		1	5		6
Philadelphia Vireo			5		5
Brown Creeper		2	2	1	5
Bay-breasted Warbler			4		4
Savannah Sparrow	1		2	1	4
Northern Flicker	2	1	1		4
Winter Wren		3	1		4
Blue-headed Vireo	1	1	1		3
Swamp Sparrow	2				2
House Wren	2				2
Western Wood-Pewee			2		2
Nashville Warbler			2		2
Golden-crowned Kinglet			2		2
Warbling Vireo		1	1		2
Veery	1				1
Purple Finch	1				1
Lapland Longspur			1		1
Olive-sided Flycatcher			1		1
<b>Total Banded</b>	<b>692</b>	<b>423</b>	<b>2617</b>	<b>25</b>	<b>3757</b>
<b>Number of Species</b>	<b>45</b>	<b>32</b>	<b>57</b>	<b>11</b>	<b>61</b>

### Appendix III. Moulting score data collected in 2003.

Date	Band	Species	Primaries										Moult	Moult %
	Number	Code	p1	p2	p3	p4	p5	p6	p7	p8	p9	p10	Total	Complete
24-Aug	210007723	AMRE	5	5	5	5	5	5	5	5	4		44	97.7778
18-Jul	210007905	AMRE	3	2	1	1	0	0	0	0	0		7	15.5556
10-Jul	210007908	AMRE	0	0	0	0	0	0	0	0	0		0	0
13-Jul	210007909	AMRE	1	0	0	0	0	0	0	0	0		1	2.22222
10-Jul	210007920	AMRE	0	0	0	0	0	0	0	0	0		0	0
10-Jul	210007921	AMRE	0	0	0	0	0	0	0	0	0		0	0
10-Jul	210007924	AMRE	1	1	1	0	0	0	0	0	0		3	6.66667
10-Jul	210007925	AMRE	1	1	0	0	0	0	0	0	0		2	4.44444
10-Jul	210007926	AMRE	1	0	0	0	0	0	0	0	0		1	2.22222
12-Jul	210007927	AMRE	1	1	0	0	0	0	0	0	0		2	4.44444
20-Jul	210007931	AMRE	3	3	3	2	0	0	0	0	0		11	24.4444
20-Jul	210007932	AMRE	5	5	5	4	3	2	2	0	0		26	57.7778
20-Jul	210007935	AMRE	1	1	0	0	0	0	0	0	0		2	4.44444
20-Jul	210007940	AMRE	4	4	4	3	1	0	0	0	0		16	35.5556
20-Jul	213037209	AMRE	4	4	3	2	1	0	0	0	0		14	31.1111
18-Jul	213038767	AMRE	2	2	0	0	0	0	0	0	0		4	8.88889
12-Jul	215092307	AMRE	3	3	3	2	1	0	0	0	0		12	26.6667
12-Jul	215092310	AMRE	1	0	0	0	0	0	0	0	0		1	2.22222
12-Jul	215092314	AMRE	0	0	0	0	0	0	0	0	0		0	0
14-Jul	215092314	AMRE	0	0	0	0	0	0	0	0	0		0	0
15-Jul	215092314	AMRE	0	0	0	0	0	0	0	0	0		0	0
18-Jul	215092314	AMRE	0	0	1	0	0	0	0	0	0		1	2.22222
30-Jul	215092314	AMRE	4	4	3	1	0	0	0	0	0		12	26.6667
22-Aug	215092314	AMRE	5	5	5	4	4	4	4	3	3		37	82.2222
23-Aug	215092314	AMRE	5	5	5	5	5	4	4	3	3		39	86.6667
12-Jul	215092315	AMRE	0	0	0	0	0	0	0	0	0		0	0
13-Jul	215092330	AMRE	2	2	2	1	0	0	0	0	0		7	15.5556
14-Jul	215092331	AMRE	0	0	0	0	0	0	0	0	0		0	0
18-Jul	215092331	AMRE	0	0	0	0	0	0	0	0	0		0	0
14-Sep	215092331	AMRE	5	5	5	5	5	5	5	5	4		44	97.7778
14-Jul	215092334	AMRE	2	2	1	0	0	0	0	0	0		5	11.1111
16-Jul	215092334	AMRE	2	2	1	0	0	0	0	0	0		5	11.1111
18-Jul	215092334	AMRE	2	2	1	1	0	0	0	0	0		6	13.3333
23-Jul	215092334	AMRE	4	4	3	2	1	1	0	0	0		15	33.3333
20-Aug	215092334	AMRE	5	5	5	5	5	5	5	5	4		44	97.7778
22-Aug	215092334	AMRE	5	5	5	5	5	5	5	5	4		44	97.7778
14-Jul	215092335	AMRE	4	4	3	1	1	0	0	0	0		13	28.8889
14-Jul	215092337	AMRE	1	0	0	0	0	0	0	0	0		1	2.22222
16-Jul	215092351	AMRE	0	0	0	0	0	0	0	0	0		0	0
16-Jul	215092354	AMRE	4	3	2	1	1	0	0	0	0		11	24.4444
15-Aug	215092354	AMRE	5	5	5	5	5	5	4	4	3		41	91.1111
17-Jul	215092357	AMRE	0	0	0	0	0	0	0	0	0		0	0
17-Jul	215092365	AMRE	0	0	0	0	0	0	0	0	0		0	0
20-Jul	215092437	AMRE	3	3	2	1	1	0	0	0	0		10	22.2222

20-Jul	215092532	AMRE	2	2	1	1	0	0	0	0	0	0	6	13.3333
21-Jul	215092572	AMRE	5	5	3	2	1	0	0	0	0	0	16	35.5556
22-Jul	215092582	AMRE	3	3	1	1	0	0	0	0	0	0	8	17.7778
24-Jul	215092612	AMRE	1	0	0	0	0	0	0	0	0	0	1	2.22222
25-Jul	215092657	AMRE	3	3	3	2	0	0	0	0	0	0	11	24.4444
26-Jul	215092692	AMRE	2	2	1	0	0	0	0	0	0	0	5	11.1111
28-Jul	215092717	AMRE	4	3	3	1	0	0	0	0	0	0	11	24.4444
01-Aug	215092859	AMRE	1	1	1	0	0	0	0	0	0	0	3	6.66667
06-Aug	215092969	AMRE	4	4	4	4	4	4	3	2	1		30	66.6667
06-Aug	215092973	AMRE	4	4	3	2	2	1	0	0	0	0	16	35.5556
12-Jul	223068072	AMRE	1	0	0	0	0	0	0	0	0	0	1	2.22222
28-Jul	223068084	AMRE	1	0	0	0	0	0	0	0	0	0	1	2.22222
10-Jul	223068191	AMRE	0	0	0	0	0	0	0	0	0	0	0	0
15-Jul	223071050	AMRE	0	0	0	0	0	0	0	0	0	0	0	0
16-Jul	223071645	AMRE	1	1	0	0	0	0	0	0	0	0	2	4.44444
20-Jul	223071645	AMRE	2	2	1	0	0	0	0	0	0	0	5	11.1111
05-Aug	223071876	AMRE	5	5	5	5	5	4	4	3	2		38	84.4444
14-Jul	223071917	AMRE	1	1	0	0	0	0	0	0	0	0	2	4.44444
02-Aug	223071999	AMRE	5	5	5	4	3	2	1	0	0	0	25	55.5556
23-Aug	223072950	AMRE	5	5	5	5	5	5	5	5	4		44	97.7778
12-Jul	223072964	AMRE	2	2	1	1	0	0	0	0	0	0	6	13.3333
05-Aug	223072964	AMRE	5	5	5	5	4	4	3	2	1		34	75.5556
05-Aug	233037012	AMRE	5	5	5	5	4	4	4	3	2		37	82.2222
05-Aug	233037023	AMRE	5	5	5	5	4	3	3	1	1		32	71.1111
05-Aug	233037025	AMRE	5	5	5	5	5	4	3	2	2		36	80
12-Aug	233037524	AMRE	5	5	5	5	5	5	4	4	3		41	91.1111
20-Aug	233037594	AMRE	5	5	5	5	5	5	3	3	1		37	82.2222
20-Aug	233037599	AMRE	5	5	5	5	5	5	5	5	4		44	97.7778
28-Aug	233038030	AMRE	5	5	5	5	5	5	5	4	4		43	95.5556
28-Aug	233038033	AMRE	5	5	5	5	5	5	5	5	5		45	100
13-Jul	94299958	AMRO	3	3	2	1	0	0	0	0	0	0	9	20
15-Jul	115242552	AMRO	4	4	3	2	1	0	0	0	0	0	14	31.1111
22-Jul	115242553	AMRO	3	2	1	1	0	0	0	0	0	0	7	15.5556
12-Jul	225006528	BAWW	2	2	1	0	0	0	0	0	0	0	5	11.1111
21-Jul	225006528	BAWW	4	4	3	2	1	0	0	0	0	0	14	31.1111
24-Jul	225006528	BAWW	4	4	4	3	2	0	0	0	0	0	17	37.7778
05-Aug	225006528	BAWW	5	5	5	5	5	3	1	0	0	0	29	64.4444
15-Jul	225006657	BAWW	0	0	0	0	0	0	0	0	0	0	0	0
13-Jul	225013202	BAWW	0	0	0	0	0	0	0	0	0	0	0	0
19-Jul	225013202	BAWW	0	0	0	0	0	0	0	0	0	0	0	0
23-Jul	225013202	BAWW	1	1	0	0	0	0	0	0	0	0	2	4.44444
25-Jul	225013202	BAWW	2	1	0	0	0	0	0	0	0	0	3	6.66667
13-Jul	225013278	BAWW	2	2	1	0	0	0	0	0	0	0	5	11.1111
14-Jul	225013567	BAWW	0	0	0	0	0	0	0	0	0	0	0	0
20-Jul	232038031	BAWW	3	3	2	1	0	0	0	0	0	0	9	20
21-Jul	232038069	BAWW	4	4	3	1	1	0	0	0	0	0	13	28.8889
27-Jul	232038234	BAWW	4	4	4	4	4	4	1	1	0		26	57.7778
02-Aug	232038359	BAWW	5	5	4	2	1	0	0	0	0	0	17	37.7778

14-Aug	167146871	BCCH	5	5	5	5	5	5	4	4	3		41	91.1111
29-Aug	167146871	BCCH	5	5	5	5	5	5	5	5	5		45	100
02-Aug	167147675	BCCH	5	5	5	5	5	4	3	1	0		33	73.3333
14-Sep	167147675	BCCH	5	5	5	5	5	5	5	5	5		45	100
08-Sep	218179256	BCCH	5	5	5	5	5	5	5	5	5		45	100
13-Jul	225006391	BCCH	5	5	5	3	1	0	0	0	0		19	38
19-Sep	225013419	BCCH	5	5	5	5	5	5	5	5	5		45	100
25-Aug	213037110	CAWA	5	5	5	5	5	5	5	5	5		45	100
11-Jul	216063082	CAWA	1	1	1	0	0	0	0	0	0		3	6.66667
10-Jul	216063114	CAWA	0	0	0	0	0	0	0	0	0		0	0
05-Aug	216063116	CAWA	5	5	5	5	5	5	5	4	4		43	95.5556
10-Jul	216063160	CAWA	5	5	5	4	4	3	1	0	0		27	60
10-Jul	216063161	CAWA	2	2	1	1	0	0	0	0	0		6	13.3333
11-Jul	216063161	CAWA	2	2	2	1	0	0	0	0	0		7	15.5556
12-Jul	216063163	CAWA	5	4	4	4	4	2	1	0	0		24	53.3333
28-Jul	216063163	CAWA	5	5	5	5	5	5	4	4	3		41	91.1111
22-Jul	216063173	CAWA	5	5	5	5	5	4	4	3	2		38	84.4444
23-Jul	216063175	CAWA	5	5	4	4	3	2	1	0	0		24	53.3333
02-Aug	216063265	CAWA	5	5	5	5	5	5	5	5	4		44	97.7778
05-Aug	216063272	CAWA	5	5	5	5	5	5	5	5	5		45	100
05-Aug	216063276	CAWA	5	5	5	5	5	4	4	4	4		41	91.1111
05-Aug	216063282	CAWA	5	5	5	5	5	4	4	3	3		39	86.6667
05-Aug	216063283	CAWA	2	1	1	1	0	0	0	0	0		5	11.1111
05-Aug	225006583	CAWA	4	4	4	4	4	3	2	1	1		27	60
13-Jul	225006617	CAWA	1	1	1	0	0	0	0	0	0		3	6.66667
08-Aug	225006617	CAWA	5	5	5	5	4	4	3	3	1		35	77.7778
02-Jul	225012864	CAWA	1	1	1	1	0	0	0	0	0		4	8.88889
20-Jul	225013258	CAWA	5	4	1	1	0	0	0	0	0		11	24.4444
05-Aug	225013258	CAWA	5	5	5	5	2	1	0	0	0		23	51.1111
29-Aug	225013258	CAWA	5	5	5	5	5	5	4	4	4		42	93.3333
20-Jul	232038028	CAWA	0	0	0	0	0	0	0	0	0		0	0
12-Aug	232038521	CAWA	5	5	5	5	5	5	5	5	4		44	97.7778
22-Jul	232038094	CCSP	1	0	0	0	0	0	0	0	0		1	2.22222
20-Jul	176121055	CEDW	0	0	0	0	0	0	0	0	0		0	0
27-Jul	176121055	CEDW	0	0	0	0	0	0	0	0	0		0	0
01-Sep	176121510	CEDW	0	0	0	0	0	0	0	0	0		0	0
13-Jul	216063164	CHSP	0	0	0	0	0	0	0	0	0		0	0
06-Aug	232038440	CHSP	0	0	0	0	0	0	0	0	0		0	0
18-Aug	232038565	CHSP	0	0	0	0	0	0	0	0	0		0	0
07-Aug	215092984	CMWA	5	5	5	4	4	4	3	2	1		33	73.3333
23-Jul	216063177	CMWA	3	3	0	0	0	0	0	0	0		6	13.3333
13-Jul	225006616	COYE	0	0	0	0	0	0	0	0	0		0	0
13-Jul	225006632	COYE	0	0	0	0	0	0	0	0	0		0	0
19-Jul	225006688	COYE	0	0	0	0	0	0	0	0	0		0	0
28-Jul	232038241	COYE	0	0	0	0	0	0	0	0	0		0	0
12-Jul	164132450	DOWO	3	3	1	1	0	0	0	0	0	0	8	16
13-Jul	176121337	DOWO	4	4	2	0	0	0	0	0	0	0	10	20
16-Jul	176121337	DOWO	5	5	5	3	0	0	0	0	0	0	18	36

13-Jul	225006626	EAPH	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Sep	176121535	GWCS	5	5	5	5	5	5	5	5	5	5	5	45	100
14-Sep	176121536	GWCS	5	5	5	5	5	5	5	5	5	5	5	45	100
13-Jul	176121048	HETH	0	0	0	0	0	0	0	0	0	0	0	0	0
22-Jul	176121059	HETH	0	0	0	0	0	0	0	0	0	0	0	0	0
11-Sep	176121531	HETH	5	5	5	5	5	5	5	5	4	4	4	43	95.5556
15-Jul	218179796	LISP	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Jul	218179826	LISP	1	1	0	0	0	0	0	0	0	0	0	2	4.44444
23-Jul	218179865	LISP	0	0	0	0	0	0	0	0	0	0	0	0	0
29-Jul	218179898	LISP	1	1	0	0	0	0	0	0	0	0	0	2	4.44444
10-Jul	210007751	MAWA	0	0	0	0	0	0	0	0	0	0	0	0	0
10-Jul	210007923	MAWA	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Jul	210007929	MAWA	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Jul	210007945	MAWA	1	1	1	0	0	0	0	0	0	0	0	3	6.66667
12-Jul	215092268	MAWA	0	0	0	0	0	0	0	0	0	0	0	0	0
14-Jul	215092282	MAWA	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Jul	215092538	MAWA	1	1	0	0	0	0	0	0	0	0	0	2	4.44444
05-Aug	223071934	MAWA	3	3	0	0	0	0	0	0	0	0	0	6	13.3333
02-Jul	216063153	MOWA	1	1	0	0	0	0	0	0	0	0	0	2	4.44444
12-Jul	225006600	MOWA	0	0	0	0	0	0	0	0	0	0	0	0	0
14-Jul	225006645	MOWA	0	0	0	0	0	0	0	0	0	0	0	0	0
20-Jul	232038012	MOWA	0	0	0	0	0	0	0	0	0	0	0	0	0
30-Jul	232038276	MOWA	2	1	1	0	0	0	0	0	0	0	0	4	8
12-Aug	232038525	MOWA	3	2	0	0	0	0	0	0	0	0	0	5	11.1111
13-Jul	216063118	MYWA	0	0	0	0	0	0	0	0	0	0	0	0	0
13-Jul	216063165	MYWA	3	2	2	1	0	0	0	0	0	0	0	8	17.7778
30-Jul	216063239	MYWA	5	5	3	3	1	0	0	0	0	0	0	17	37.7778
18-Jul	225006424	MYWA	1	0	0	0	0	0	0	0	0	0	0	1	2.22222
19-Sep	225006424	MYWA	5	5	5	5	5	5	5	5	4	4	4	43	95.5556
15-Sep	225006491	MYWA	5	5	5	5	5	5	5	5	5	5	5	45	100
18-Jul	225006546	MYWA	5	3	2	0	0	0	0	0	0	0	0	10	22.2222
12-Jul	225006615	MYWA	1	1	1	0	0	0	0	0	0	0	0	3	6.66667
05-Aug	225013206	MYWA	5	5	5	4	4	3	0	0	0	0	0	26	57.7778
30-Jul	232038260	MYWA	4	4	4	2	1	0	0	0	0	0	0	15	33.3333
31-Jul	232038293	MYWA	5	5	4	3	1	0	0	0	0	0	0	18	40
31-Jul	232038300	MYWA	5	5	4	3	1	1	0	0	0	0	0	19	42.2222
31-Jul	232038324	MYWA	3	3	1	0	0	0	0	0	0	0	0	7	15.5556
02-Aug	232038356	MYWA	3	3	2	0	0	0	0	0	0	0	0	8	17.7778
18-Aug	232038560	MYWA	5	5	5	5	5	5	4	4	4	4	4	42	93.3333
27-Aug	232038641	MYWA	5	5	5	4	4	3	1	0	0	0	0	27	60
28-Aug	232038709	MYWA	5	5	5	5	5	5	4	4	3	3	3	41	91.1111
30-Aug	232038777	MYWA	5	5	5	5	4	4	2	0	0	0	0	30	66.6667
31-Aug	232038811	MYWA	5	5	5	5	5	5	5	4	4	4	4	43	95.5556
06-Sep	232038982	MYWA	5	5	4	4	0	2	1	0	0	0	0	21	46.6667
14-Sep	232038994	MYWA	5	5	5	5	5	5	4	3	2	2	2	39	86.6667
14-Sep	232038998	MYWA	5	5	5	5	5	5	4	4	3	3	3	41	91.1111
14-Sep	235047001	MYWA	5	5	5	5	5	5	5	5	4	4	4	44	97.7778
14-Sep	235047003	MYWA	5	5	5	5	5	5	5	5	5	5	5	45	100

14-Sep	235047008	MYWA	5	5	5	5	5	5	5	5	5	4		44	97.7778
15-Sep	235047017	MYWA	5	5	5	5	5	5	5	5	4	4		43	95.5556
15-Sep	235047020	MYWA	5	5	5	5	5	5	5	5	5	5		45	100
15-Sep	235047025	MYWA	5	5	5	5	5	5	5	5	5	5		45	100
15-Sep	235047026	MYWA	5	5	5	5	5	5	5	4	3	2		39	86.6667
15-Sep	235047027	MYWA	5	5	5	5	5	5	5	5	4	4		43	95.5556
19-Sep	235047031	MYWA	5	5	5	5	5	5	5	5	4	3		42	93.3333
19-Sep	235047034	MYWA	5	5	5	5	5	5	5	5	5	5		45	100
19-Sep	235047037	MYWA	5	5	5	5	5	5	5	5	4	3		42	93.3333
19-Sep	235047039	MYWA	5	5	5	5	5	5	5	5	5	4		44	97.7778
19-Sep	235047055	MYWA	5	5	5	5	5	5	5	5	5	5		45	100
19-Sep	235047056	MYWA	5	5	5	5	5	5	5	4	3	3		40	88.8889
19-Sep	235047057	MYWA	5	5	5	5	5	5	5	5	4	4		43	95.5556
19-Sep	235047058	MYWA	5	5	5	5	5	5	5	5	4	4		43	95.5556
19-Sep	235047061	MYWA	5	5	5	5	5	5	5	4	4	3		41	91.1111
19-Sep	235047066	MYWA	5	5	5	5	5	5	5	4	4	3		41	91.1111
19-Sep	235047071	MYWA	5	5	5	5	5	5	5	5	4	4		43	95.5556
19-Sep	235047075	MYWA	5	5	5	5	5	5	5	5	4	4		43	95.5556
19-Sep	235047077	MYWA	5	5	5	5	5	5	5	4	3	3		40	88.8889
19-Sep	235047078	MYWA	5	5	5	5	5	5	5	5	5	5		45	100
19-Sep	235047079	MYWA	5	5	5	5	5	5	5	5	4	4		43	95.5556
19-Sep	235047081	MYWA	5	5	5	5	5	5	5	5	5	5		45	100
19-Sep	235047082	MYWA	5	5	5	5	5	5	5	5	5	4		44	97.7778
19-Sep	235047084	MYWA	5	5	5	5	5	5	5	5	4	4		43	95.5556
19-Sep	235047085	MYWA	5	5	5	5	5	5	5	5	5	5		45	100
19-Sep	235047086	MYWA	5	5	5	5	5	5	5	5	5	5		45	100
19-Sep	235047088	MYWA	5	5	5	5	5	5	5	5	5	4		44	97.7778
19-Sep	235047089	MYWA	5	5	5	5	5	5	5	4	4	4		42	93.3333
19-Sep	235047091	MYWA	5	5	5	5	5	5	5	5	5	5		45	100
19-Sep	235047092	MYWA	5	5	5	5	5	5	5	4	4	4		42	93.3333
19-Sep	235047100	MYWA	5	5	5	5	5	5	5	5	4	4		43	95.5556
19-Sep	235047101	MYWA	5	5	5	5	5	5	5	5	5	4		44	97.7778
19-Sep	235047106	MYWA	5	5	5	5	5	5	5	5	5	5		45	100
19-Sep	235047107	MYWA	5	5	5	5	5	5	5	5	5	5		45	100
19-Sep	235047110	MYWA	5	5	5	5	5	5	5	5	5	5		45	100
19-Sep	235047111	MYWA	5	5	5	5	5	5	5	5	5	4		44	97.7778
19-Sep	235047112	MYWA	5	5	5	5	5	5	5	5	5	4		44	97.7778
19-Sep	235047113	MYWA	5	5	5	5	5	5	5	4	3	2		39	86.6667
19-Sep	235047115	MYWA	5	5	5	5	5	5	5	5	4	4		43	95.5556
19-Sep	235047117	MYWA	5	5	5	5	5	5	5	5	5	5		45	100
19-Sep	235047119	MYWA	5	5	5	5	5	5	5	5	5	5		45	100
19-Sep	235047121	MYWA	5	5	5	5	5	5	5	4	4	4		42	93.3333
19-Sep	235047125	MYWA	5	5	5	5	5	5	5	4	4	4		42	93.3333
19-Sep	235047126	MYWA	5	5	5	5	5	5	5	5	5	4		44	97.7778
19-Sep	235047127	MYWA	5	5	5	5	5	5	5	5	4	4		43	95.5556
19-Sep	235047135	MYWA	5	5	5	5	5	5	5	5	5	5		45	100
24-Sep	235047146	MYWA	5	5	5	5	5	5	5	5	5	4		44	97.7778
19-Jul	218179841	NOWA	1	0	0	0	0	0	0	0	0	0		1	2.22222



14-Sep	233038107	OCWA	5	5	5	5	5	5	5	5	5	4		44	97.7778
31-Aug	169191011	OVEN	5	5	5	5	5	5	5	5	4	4		43	95.5556
10-Jul	218179010	OVEN	0	0	0	0	0	0	0	0	0	0		0	0
13-Aug	218179035	OVEN	5	5	5	5	5	4	3	2	1			35	77.7778
12-Jul	218179040	OVEN	1	1	0	0	0	0	0	0	0	0		2	4.44444
15-Jul	218179040	OVEN	0	0	0	0	0	0	0	0	0	0		0	0
19-Jul	218179802	OVEN	0	0	0	0	0	0	0	0	0	0		0	0
12-Jul	218179816	OVEN	3	3	0	0	0	0	0	0	0	0		6	13.3333
13-Jul	218179816	OVEN	3	3	1	0	0	0	0	0	0	0		7	15.5556
17-Jul	218179816	OVEN	4	4	2	0	0	0	0	0	0	0		10	22.2222
12-Jul	218179818	OVEN	1	0	0	0	0	0	0	0	0	0		1	2.22222
16-Jul	218179832	OVEN	5	5	4	1	1	0	0	0	0	0		16	35.5556
17-Jul	218179835	OVEN	3	3	1	0	0	0	0	0	0	0		7	15.5556
19-Jul	218179838	OVEN	0	0	0	0	0	0	0	0	0	0		0	0
21-Jul	218179850	OVEN	4	3	1	1	0	0	0	0	0	0		9	20
23-Jul	218179869	OVEN	2	2	0	0	0	0	0	0	0	0		4	8.88889
27-Jul	218179894	OVEN	5	5	4	4	4	2	2	0	0	0		26	57.7778
31-Jul	218179906	OVEN	5	4	3	0	0	0	0	0	0	0		12	26.6667
15-Aug	218179974	OVEN	5	5	5	5	5	5	5	5	5	4		44	97.7778
15-Aug	218179978	OVEN	5	5	5	5	5	5	5	5	5	4		44	97.7778
19-Jul	225006697	PISI	0	0	0	0	0	0	0	0	0	0		0	0
20-Aug	232038585	PISI	5	2	1	0	0	0	0	0	0	0		8	17.7778
26-Aug	232038612	PISI	5	4	4	4	0	0	0	0	0	0		17	37.7778
14-Aug	233037534	RCKI	5	5	5	4	3	2	1	0	0			25	55.5556
19-Sep	233038120	RCKI	5	5	5	5	5	5	5	5	5	5		45	100
24-Sep	233038134	RCKI	5	5	5	5	5	5	4	4	4	4	4	46	92
14-Jul	176121226	SOSP	0	0	0	0	0	0	0	0	0	0		0	0
16-Jul	176121226	SOSP	0	0	0	0	0	0	0	0	0	0		0	0
26-Jul	176121226	SOSP	0	0	0	0	0	0	0	0	0	0		0	0
13-Jul	176121339	SOSP	0	0	0	0	0	0	0	0	0	0		0	0
14-Jul	176121342	SOSP	0	0	0	0	0	0	0	0	0	0		0	0
25-Jul	176121342	SOSP	0	0	0	0	0	0	0	0	0	0		0	0
19-Jul	176121346	SOSP	0	0	0	0	0	0	0	0	0	0		0	0
03-Aug	176121402	SOSP	0	0	0	0	0	0	0	0	0	0		0	0
05-Aug	176121405	SOSP	0	0	0	0	0	0	0	0	0	0		0	0
04-Aug	133318104	SSHA	5	5	5	5	5	5	1	0	0	0	0	31	62
27-Jul	154306013	SSHA	5	5	5	5	5	5	4	3	0	0	0	37	74
22-Jul	154306029	SSHA	5	5	5	5	4	3	1	0	0			28	56
12-Jul	146111397	SWTH	1	1	1	0	0	0	0	0	0	0		3	6.66667
20-Jul	176121051	SWTH	2	2	1	1	0	0	0	0	0	0		6	13.3333
23-Jul	176121062	SWTH	2	2	2	1	1	0	0	0	0	0		8	17.7778
29-Aug	176121302	SWTH	5	5	5	5	5	5	5	4	4			43	95.5556
14-Jul	176121303	SWTH	0	0	0	0	0	0	0	0	0	0		0	0
12-Jul	176121333	SWTH	0	0	0	0	0	0	0	0	0	0		0	0
12-Jul	176121334	SWTH	1	1	0	0	0	0	0	0	0	0		2	4.44444
14-Jul	176121341	SWTH	1	1	1	0	0	0	0	0	0	0		3	6.66667
17-Jul	176121343	SWTH	0	0	0	0	0	0	0	0	0	0		0	0
18-Jul	176121344	SWTH	0	0	0	0	0	0	0	0	0	0		0	0

29-Aug	176121344	SWTH	5	5	5	5	5	5	5	4	4		43	95.5556
19-Jul	176121347	SWTH	1	0	0	0	0	0	0	0	0		1	2.22222
20-Jul	176121349	SWTH	1	1	1	1	0	0	0	0	0		4	8.88889
22-Jul	176121354	SWTH	0	0	0	0	0	0	0	0	0		0	0
23-Jul	176121357	SWTH	1	0	0	0	0	0	0	0	0		1	2.22222
25-Jul	176121365	SWTH	2	2	1	1	0	0	0	0	0		6	13.3333
25-Jul	176121366	SWTH	0	0	0	0	0	0	0	0	0		0	0
31-Jul	176121391	SWTH	1	1	0	0	0	0	0	0	0		2	4.44444
15-Aug	176121445	SWTH	5	5	5	5	5	5	5	4	4		43	95.5556
27-Aug	176121473	SWTH	5	5	5	5	5	5	5	5	5		45	100
29-Aug	176121493	SWTH	5	5	5	5	5	5	5	5	4		44	97.7778
30-Aug	176121496	SWTH	5	5	5	5	5	5	5	5	4		44	97.7778
10-Sep	176121526	SWTH	5	5	5	5	5	5	5	5	4		44	97.7778
12-Jul	215092311	TEWA	0	0	0	0	0	0	0	0	0		0	0
13-Jul	215092318	TEWA	0	0	0	0	0	0	0	0	0		0	0
14-Jul	215092344	TEWA	0	0	0	0	0	0	0	0	0		0	0
18-Jul	215092393	TEWA	1	1	0	0	0	0	0	0	0		2	4.44444
19-Jul	215092416	TEWA	3	3	2	1	0	0	0	0	0		9	20
19-Jul	215092423	TEWA	1	1	0	0	0	0	0	0	0		2	4.44444
28-Aug	233038027	TEWA	5	5	5	5	5	5	5	5	4		44	97.7778
20-Jul	176121350	WETA	0	0	0	0	0	0	0	0	0		0	0
18-Aug	233037572	WIWA	5	5	5	5	5	5	5	4	4		43	95.5556
28-Aug	233038032	WIWA	5	5	5	5	5	5	5	5	4		44	97.7778
13-Jul	210007930	WIWR	0	0	0	0	0	0	0	0	0		0	0
22-Jul	145190584	WTSP	0	0	0	0	0	0	0	0	0		0	0
12-Jul	164132451	WTSP	0	0	0	0	0	0	0	0	0		0	0
12-Jul	164132678	WTSP	0	0	0	0	0	0	0	0	0		0	0
15-Aug	164132846	WTSP	4	4	3	2	1	0	0	0	0		14	31.1111
22-Jul	176121013	WTSP	0	0	0	0	0	0	0	0	0		0	0
13-Jul	176121015	WTSP	0	0	0	0	0	0	0	0	0		0	0
13-Jul	176121030	WTSP	0	0	0	0	0	0	0	0	0		0	0
11-Jul	176121040	WTSP	0	0	0	0	0	0	0	0	0		0	0
13-Jul	176121049	WTSP	0	0	0	0	0	0	0	0	0		0	0
13-Jul	176121050	WTSP	0	0	0	0	0	0	0	0	0		0	0
20-Jul	176121056	WTSP	0	0	0	0	0	0	0	0	0		0	0
16-Jul	176121232	WTSP	0	0	0	0	0	0	0	0	0		0	0
21-Jul	176121311	WTSP	0	0	0	0	0	0	0	0	0		0	0
07-Sep	176121311	WTSP	5	5	5	5	5	5	4	4	3		41	91.1111
13-Jul	176121338	WTSP	0	0	0	0	0	0	0	0	0		0	0
19-Jul	176121348	WTSP	0	0	0	0	0	0	0	0	0		0	0
23-Jul	176121360	WTSP	0	0	0	0	0	0	0	0	0		0	0
26-Jul	176121368	WTSP	0	0	0	0	0	0	0	0	0		0	0
27-Jul	176121378	WTSP	1	1	0	0	0	0	0	0	0		2	4.44444
13-Jul	803157942	YBSA	3	3	2	1	0	0	0	0	0	0	9	18
19-Jul	803157942	YBSA	4	4	3	2	0	0	0	0	0	0	13	26
13-Jul	804165718	YBSA	0	0	0	0	0	0	0	0	0	0	0	0
30-Jul	804165718	YBSA	4	3	3	2	1	0	0	0	0	0	13	26
11-Aug	216064442	YWAR	5	5	5	5	5	5	5	4	4		43	95.5556

15-Jul	223072832	YWAR	0	0	0	0	0	0	0	0	0	0	0	0	0
17-Jul	223072832	YWAR	0	0	0	0	0	0	0	0	0	0	0	0	0
21-Jul	225006530	YWAR	1	1	0	0	0	0	0	0	0	0	2	4.44444	
12-Jul	225006601	YWAR	1	1	0	0	0	0	0	0	0	0	2	4.44444	
13-Jul	225006625	YWAR	2	2	1	1	0	0	0	0	0	0	6	13.3333	
15-Jul	225006656	YWAR	1	1	0	0	0	0	0	0	0	0	2	4.44444	
15-Jul	225006660	YWAR	1	1	0	0	0	0	0	0	0	0	2	4.44444	
19-Jul	225006689	YWAR	4	4	4	3	3	2	1	0	0	0	21	46.6667	
19-Jul	225006700	YWAR	0	0	0	0	0	0	0	0	0	0	0	0	
21-Jul	225013505	YWAR	5	4	4	1	1	0	0	0	0	0	15	33.3333	
29-Jul	232038244	YWAR	3	2	1	1	0	0	0	0	0	0	7	15.5556	