

Albert Creek Bird Observatory Final Report 2013



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Society of Yukon Bird Observatories
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The 2013 operation of the Albert Creek Bird Observatory was made possible due to support and financial contributions from the following organizations.



Environment
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Cover Photo: Ovenbird banded May 28, 2013 (Photo: Jukka Jantunen).

The Albert Creek Bird Observatory is a project of the Society of Yukon Bird Observatories (SOYBO; PO Box 30056, Whitehorse, YT, Y1A 5M2). SOYBO was established during 2010 to formalize the operation of the Yukon Bird Observatories. The objectives of SOYBO are: (1) contribute to the conservation of

EXECUTIVE SUMMARY

The Albert Creek Bird Observatory completed its thirteenth consecutive year of spring migration monitoring during 2013. The field station operated for a total of 37 days from April 23 to May 31. The monitoring effort 2013 was delayed at the start of the season due to the late spring and was cut short at the end of May due to rising flood waters at the site. The primary method of monitoring bird migration at the study site is through the use of standardized mist netting and banding of birds captured. Mist netting resulted in the capture and banding of 2,011 birds of 50 species; the top 5 species banded were White-crowned Sparrow, Common Redpoll, Wilson's Warbler, Fox Sparrow and Northern Waterthrush. Three species of warbler (Blackpoll, Yellow-rumped and Yellow) were banded in near record lows during 2013. These species are typically among the most common species banded and their low capture rates during 2013 negatively influenced the overall number of birds banded. Species with a restricted range in the Yukon continue to be monitored at Albert Creek, including: Cape May Warbler, Western Tanager, Swamp Sparrow and White-throated Sparrow. The data collected at the observatory in 2013 builds upon the database of knowledge pertaining to the birds of the Yukon. Over the long term, this data will form a crucial step in the calculation of population trend analyses for numerous bird species. The observatory continues to attract numerous volunteers to assist with day to day operations; in 2013 a total of 643 volunteer hours were tallied at the station. Numerous visitors also continue to be attracted to the site; this year the station had a total of 15.5 visitor hours.

ACKNOWLEDGEMENTS

Jukka Jantunen & Ted Murphy-Kelly were the primary Banders-In-Charge of the bird observatory during the 2013 season. Jukka and Ted's bird identification skills and perseverance were once again a definite asset to the quality of the data collected at the observatory.

The following list summarizes the individuals who played a role in the 2013 operation of the Albert Creek Bird Observatory.

Ted Murphy-Kelly	Station Manager, Secondary Bander In Charge, Report Editing
Jukka Jantunen	Primary Bander In Charge, Report Editing
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Lea Pigage	Report Editing

Cameron Eckert (YG-Environment) and Pam Sinclair (CWS) provided advice and assisted with project logistics. The staff at the Yukon Department of Environment – Watson Lake Office also assisted with project logistics. Board members of the Society of Yukon Bird Observatories helped administer the Yukon Bird Observatories.

The following volunteers assisted with the operation of the observatory: over 25 days – Ayla Mullen, Rhianna Stavish; 10 to 20 days – Susan Drury; 5 to 10 days – Julie Bauer, Sarah Davidson, Terry Skjonsberg; 1 to 5 days – Gwen Baluss, Hollie Murphy-Kelly, Martin Own, Ben Schonewille.

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1.0 Introduction

In 2013, the Albert Creek Bird Observatory (the observatory) operated during the spring migration season only. The observatory completed its thirteenth year of operation thanks to financial support from several government and non-government agencies. Although the observatory began operation during 2001, monitoring at the site became standardized and more rigorous beginning in 2004.

The goals of the Albert Creek Bird Observatory are to:

- Gather baseline information on birds and bird migration in the southeast Yukon.
- Collect data to facilitate the long term monitoring (*i.e.* trend analysis) of birds in the southeast Yukon.
- Conduct and participate in specific studies such as feather collection and color banding of species of interest.
- Provide a setting for the public including school groups to learn about birds and bird migration.
- Provide employment and training opportunities for students and volunteers.
- Provide a unique tourist attraction for the community of Watson Lake.

The observatory carries out research on birds which is shared through an international bird banding database (Canadian Wildlife Service's Bird Banding Office and USGS Bird Banding Laboratory), Society of Yukon Bird Observatories annual station reports, and other publications. Many of the birds banded at Albert Creek are highly migratory spending the winter months as far south as Central and South America. In addition to the potential knowledge gained from band recoveries, the observatory also continues to gather baseline data of birds (and their migration) in the Liard region, and the Yukon as a whole. Due to the large landmass of the territory, and the relatively few bird biologists and advanced birders in the Yukon, there is still a great deal to be learned regarding the bird life of the Yukon. This is even more pronounced in the southeast Yukon, where a number of species are at the extreme northwest of their range. A number of species are not regularly found west of Albert Creek, thus allowing the observatory to monitor the presence of these species in the territory. The observatory serves as a highly valuable research and monitoring project to better understand the distribution of many of the Yukon's bird species, many of which are considered uncommon or rare. Over the long term, the data collected at the observatory will facilitate trend analysis for a number of species. Such information will be valuable for conservation and monitoring of bird populations not only in the Yukon, but North America as a whole.

The observatory plays a role in education as a place where the public, volunteers and students can take part in a unique, community based research project. Across the Yukon (and the world), there are numerous people who have an interest in birds; however, many find it a daunting task to learn the various species. For such people, a visit to the observatory can be extremely rewarding as they often have the opportunity to get close up views of many bird species which are difficult to observe in nature. The highly trained individuals working at the observatory have the ability to identify these species with ease and are happy to teach the public about birds.

2.0 Methods

The methods for the operation of the bird observatory follow the Albert Creek Bird Observatory Field Protocol and Manual (Appendix A). A brief summary of the field protocol is described in the following sections; however, for a detailed description refer to the aforementioned document. All monitoring activities at the observatory can be separated into standardized and non-standardized. To facilitate long term analysis of the observatory's data, the standardized data is collected in the same format year after year. Non standardized activities may include species specific mist nets within the count area or the collection of banding / observation data outside of the standard count period. For every species observed, estimated totals are calculated for every day of operation using the following categories;

- Band: new birds banded
- Recaptures: previously banded birds, not included if recaptured on the initial day of banding
- Other Visual Migrants: birds in obvious migration flight observed incidentally
- Census: birds observed while on census only
- Observed: all other bird observations includes incidental observations and the lake counts

Using the categories outlined above, the Bander-In-Charge estimates the total number of birds observed within/passing through the count area within the standard count period on a daily basis. Using only the standard count period data, this number represents the “Daily Estimated Total – DET” and when the non-standard data is included, this number represents the “Daily Species Total – DST”.

2.1 Mist Netting

The primary method of monitoring the movement of birds at the study site is the use of mist nets for the purpose of capturing and banding birds. The observatory operates with 23 standard mist nets and one non-standard mist net (Figure 1). Non-standard nets used in 2013 were limited to net 27 (target: Rusty Blackbirds) and nets 24 to 26 (target: owls). All nets are 30 mm mesh and 12 m in length, with the exception of nets 18 and 22 which are 18 m in length. The standard mist netting effort begins at official sunrise and continues for 6 hours. The full mist netting effort is achieved only on days when adequate personnel are present onsite and weather conditions are favorable. If this is not possible, the effort is reduced in the number of nets operated rather than reducing the duration of effort.

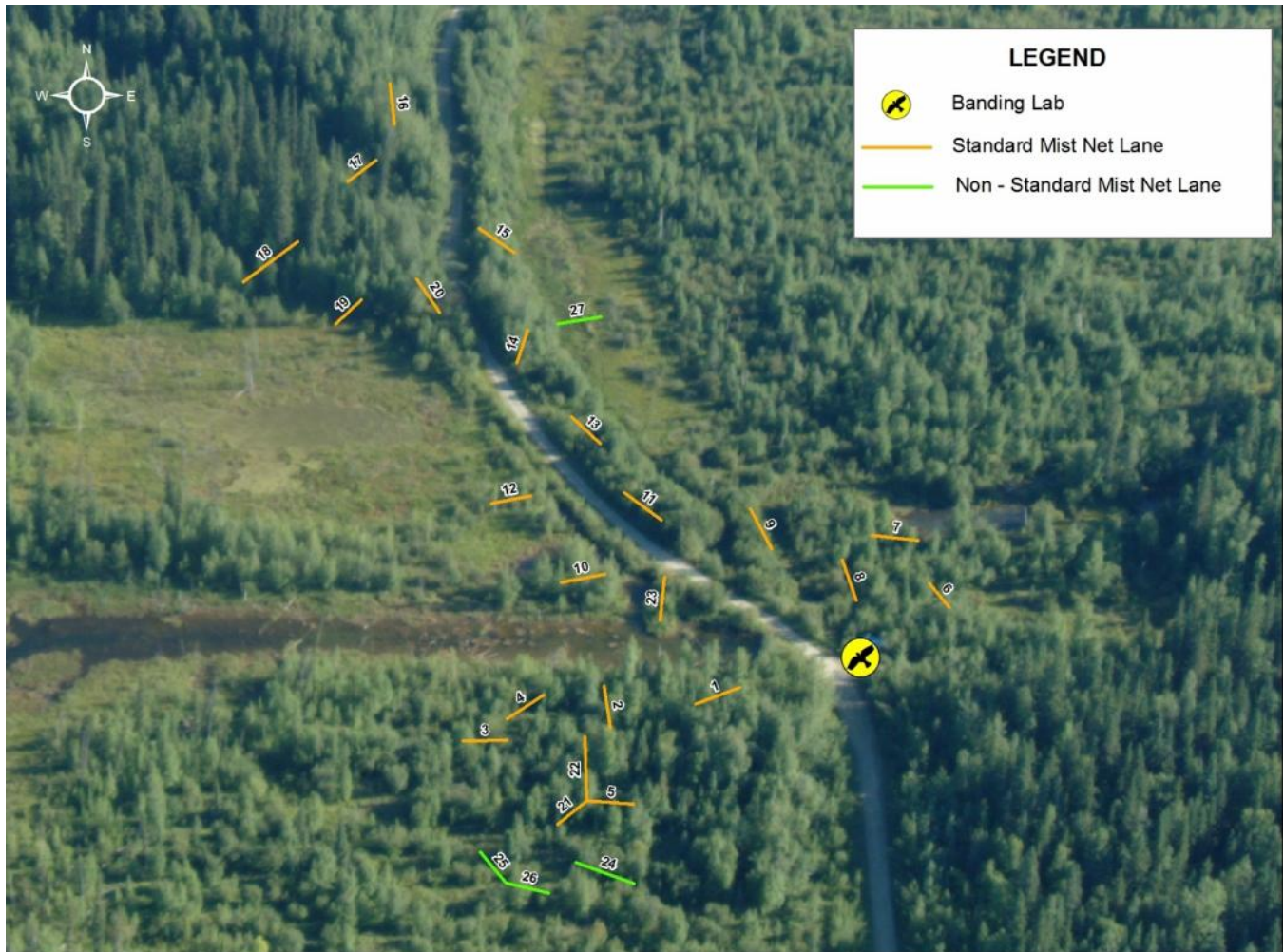


Figure 1. Overview of study area.

2.2 Census

To supplement the banding data, five short census “legs” are surveyed on a daily basis as personnel allow. Many other observatories operate a longer (1 hour) census through the count area; however, this is not possible at Albert Creek due to inconsistent numbers of qualified observers on site. Census legs are predefined routes which are followed by a single observer to record bird observations independent from the mist netting captures and incidental observations. The short census legs allow for a single observer to census birds without committing a full hour to this activity. On days when bird captures are relatively low/moderate and/or adequate personnel are onsite, these census legs can be surveyed in combination with the mist net checks.

2.3 *Incidental Observations*

Incidental observations are collected on a continuous basis at the observatory. For example, birds observed while conducting mist net checks would be considered incidental observations. Any birds in obvious migration flight (flying over the site) are recorded as 'other visual migrants' on the daily log sheets.

2.4 *Study Site*

The bird observatory is located along Albert Creek in the Liard River Valley, 15 km west of the community of Watson Lake in the southeast region of the Yukon Territory. The majority of the site is composed of a regenerating forest with the marsh being the defining feature of the study site. The area is dominated by willow (*Salix* spp.), alder (*Alnus* spp.) and regenerating white birch (*Betula papyrifera*) with some mature white spruce (*Picea glauca*), trembling aspen (*Populus tremuloides*) and balsam poplar (*Populus balsamifera*) scattered throughout. The under-story vegetation within the regenerating portion of the study site consists primarily of red clover (*Trifolium pretense*), fireweed (*Epilobium augustifolium*), yarrow (*Achillea millefolium*), red raspberry (*Rubus idaeus*), prickly rose (*Rosa acicularis*) as well as various grass species (*Poa* spp). Within the stands of mature white spruce, the under-story is dominated by various bryophytes and cranberry (*Vaccinium vitis-idea*) with willow, alder and red osier dogwood (*Cornus stolonifera*) scattered throughout.

3.0 Results & Discussion

During 2013, the observatory operated during the spring season only. A total of 2,011 birds of 50 species were banded and 120 species were observed (Table 1, Table 3). The all-time total number of birds banded at Albert Creek Bird Observatory is now 45,452 birds of 92 species/forms and 170 species/forms have been observed (Appendix B). New species added to the station checklist during 2013 included Baird’s Sandpiper, Eurasian Collared Dove, Mountain Bluebird, Gray-crowned Rosy Finch and Hoary Redpoll. Weather conditions largely influence the activities at the observatory. Cold temperatures, precipitation and windy conditions reduce the mist netting effort and subsequent number of birds banded. The 2013 season saw unprecedented cold temperatures and snowpack persistence during the first few weeks of operation (Table 2) and the region wide late spring resulted in a late arrival of most early season passerine migrants. It wasn’t until weeks 5 and 6 (late May) that the weather became more typical of the season. The observatory typically operates into the first week of June to collect data on later migrating species; however, rising flood waters at the study site resulted in a shortened season when ended on May 31.

Each component of the 2013 data is summarized and presented in the following subsections; however, a summary account of the 2013 estimated total data is shown in Appendix C. Note that unless otherwise stated, the results presented in this report combine and summarize both standard and non-standardized data.

Table 1. Summary statistics for the 2013 spring season.

Week	Date	Days Operated	Birds Banded						Total Species Observed
			#	Species	Net Hours	Ground Trap Hours	#/100 Net Hours	#/10 Ground Trap Hours	
1	23 – 29 Apr	5	2	2	90.8	1.5	1.10	6.67	17
2	30 Apr – 6 May	7	249	10	392.8	0.0	63.39	0.00	40
3	7 – 13 May	7	1022	21	910.5	145.0	104.45	4.90	70
4	14 – 20 May	7	318	26	846.0	60.0	35.82	2.50	77
5	21 – 27 May	7	341	35	926.0	0.0	36.83	0.00	86
6	28 – 31 May	4	79	24	537.5	0.0	14.70	0.00	71
ALL		37	2011	50	3703.6	206.5	51.94	42.13	120

Table 2. Summary of weather conditions during the 2013 spring season.

Weather Parameter	Week					
	1	2	3	4	5	6
Average Opening Temperature	-3.0	-0.2	-0.4	-1.4	2.1	9.8
Average Closing Temperature	0.5	8.1	12.0	11.6	16.0	14.5
Average Opening Wind	1.1	0.1	0.0	0.2	0.5	0.0
Average Closing Wind	1.5	1.4	0.4	1.8	1.4	1.9
Days with Rain	0	0	1	1	1	1
Days with Snow	4	1	0	1	0	0

During 2013, spring arrived relatively late across the southern Yukon and the snowpack persisted well into May at the observatory. These conditions reflect the timing of birds banded at the observatory which did not begin in earnest until May 6 (Figure 1). These first birds banded included redpolls and various species of sparrow which typically arrive at the observatory during the last week of April. Although relatively late, these species were banded in near average numbers between May 6 and 12. White-crowned Sparrow dominated the birds banded in the first half of the season with a season banding total of 336 individuals (Table 3).

The final 10 days of May typically represent the highest numbers of birds banded, particularly for the warblers including Wilsons, Blackpoll, Yellow and Yellow-rumped warblers. Of these species, only Wilson’s Warbler was banded in typical numbers with 228 banded (Table 3). Blackpoll Warbler was banded in record low numbers with only 5 individuals compared to the 2006-2012 spring average of 80 individuals and a record high of 121 individuals in 2011. Yellow Warbler followed a similar pattern with only 23 banded compared to the 2006-2012 average of 251 birds and the record high of 485 in 2012. Yellow-rumped Warbler numbers are often variable between years although the 2013 banding total of 61 birds was far below the 2006-2012 average of 425 individuals and the record high of 776 in 2010. The reason for these drastically low banding totals is unclear; however, it is likely that the late spring resulted in these species passing directly over the site enroute to breeding territories to the north and northwest of the observatory.

The early closing date in 2013 likely reduced the banding totals for late season migrants such as Alder Flycatcher, Tennessee Warbler and American Redstart. This was compounded by the late spring which appeared to delay the migration of these species.

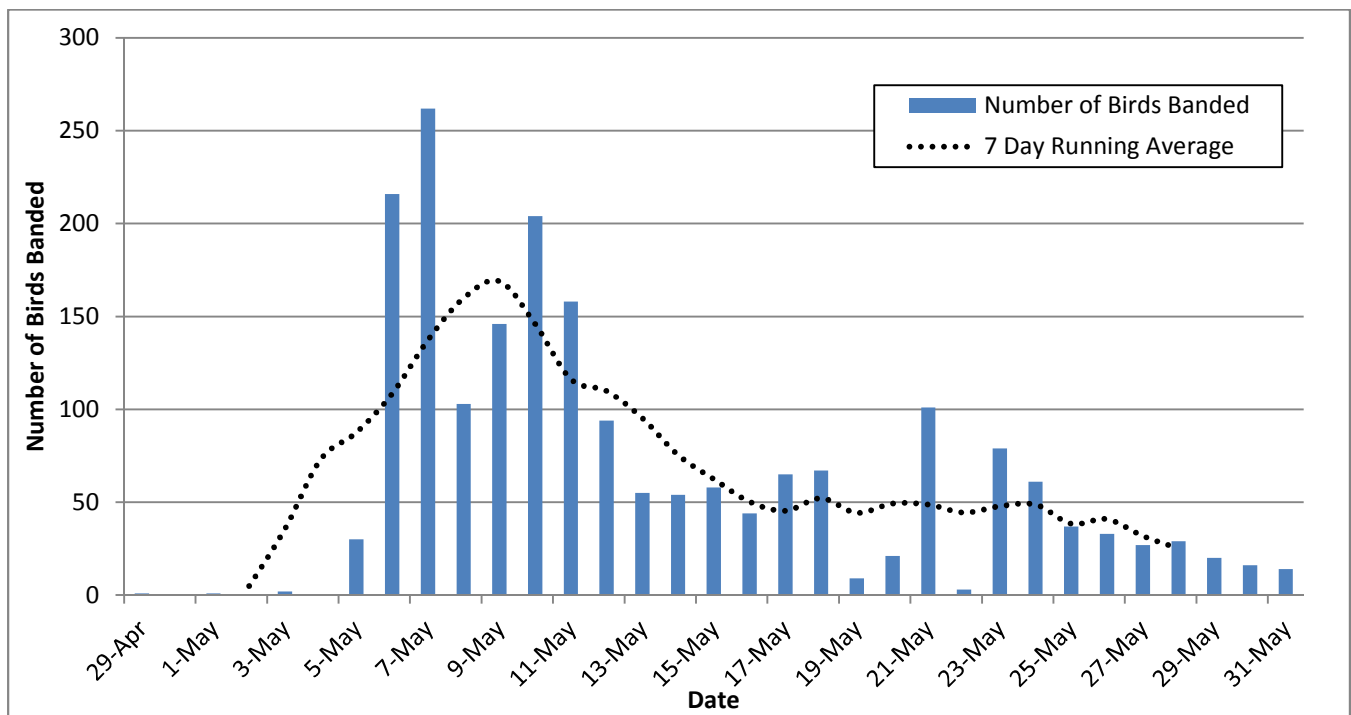


Figure 1. Summary of birds banded per day during the spring at Albert Creek during 2013.

Table 3. Birds banded during the 2013 spring season.

Common Name	Scientific Name	Mist Nets		Ground Traps	
		# Banded	# Banded / 1000 Net Hrs	# Banded	# Banded / 1000 Trap Hrs
Northern Harrier	<i>Circus cyaneus</i>	1	0.27		
Sharp-shinned Hawk	<i>Accipiter striatus</i>	2	0.54		
Solitary Sandpiper	<i>Tringa solitaria</i>	2	0.54		
Belted Kingfisher	<i>Ceryle alcyon</i>	1	0.27		
Yellow-bellied Sapsucker	<i>Sphyrapicus varius</i>	5	1.35		
Hairy Woodpecker	<i>Picoides villosus</i>	2	0.54		
American Three-toed Woodpecker	<i>Picoides dorsalis</i>	1	0.27		
Alder Flycatcher	<i>Empidonax alnorum</i>	5	1.35		
Least Flycatcher	<i>Empidonax minimus</i>	5	1.35		
Hammond's Flycatcher	<i>Empidonax hammondi</i>	5	1.35		
Dusky Flycatcher	<i>Empidonax oberholseri</i>	1	0.27		
Say's Phoebe	<i>Sayornis saya</i>	1	0.27		
Warbling Vireo	<i>Vireo gilvus</i>	5	1.35		
Gray Jay	<i>Perisoreus canadensis</i>	3	0.81		
Tree Swallow	<i>Tachycineta bicolor</i>	7	1.89		
Black-capped Chickadee	<i>Poecile atricapillus</i>	1	0.27		
Boreal Chickadee	<i>Poecile hudsonicus</i>	2	0.54		
Ruby-crowned Kinglet	<i>Regulus calendula</i>	72	19.41		
Gray-cheeked Thrush	<i>Catharus minimus</i>	17	4.58		
Swainson's Thrush	<i>Catharus ustulatus</i>	43	11.59		
Hermit Thrush	<i>Catharus guttatus</i>	1	0.27		
American Robin	<i>Turdus migratorius</i>	15	4.04		
Ovenbird	<i>Seiurus aurocapilla</i>	1	0.27		
Northern Waterthrush	<i>Parkesia noveboracensis</i>	106	28.57		
Tennessee Warbler	<i>Oreothlypis peregrina</i>	19	5.12		
Orange-crowned Warbler	<i>Oreothlypis celata</i>	78	21.02		
Common Yellowthroat	<i>Geothlypis trichas</i>	40	10.78		
American Redstart	<i>Setophaga ruticilla</i>	1	0.27		
Yellow Warbler	<i>Setophaga petechia</i>	23	6.20		
Cape May Warbler	<i>Setophaga tigrina</i>	1	0.27		
Blackpoll Warbler	<i>Setophaga striata</i>	5	1.35		
Myrtle Warbler	<i>Setophaga coronata</i>	61	16.44		
Wilson's Warbler	<i>Cardellina pusilla</i>	228	61.46		
American Tree Sparrow	<i>Spizella arborea</i>	61	16.44		
Chipping Sparrow	<i>Spizella passerina</i>	4	1.08		
Savannah Sparrow	<i>Passerculus sandwichensis</i>	63	16.98		
Fox Sparrow	<i>Passerella iliaca</i>	145	39.08	10	48.43
Lincoln's Sparrow	<i>Melospiza lincolnii</i>	101	27.22		
Swamp Sparrow	<i>Melospiza georgiana</i>	3	0.81		
White-throated Sparrow	<i>Zonotrichia albicollis</i>	17	4.58	5	24.21
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	336	90.57	58	280.87
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>	15	4.04		
Slate-colored Junco	<i>Junco hyemalis</i>	92	24.80	10	48.43
Rusty Blackbird	<i>Euphagus carolinus</i>	8	2.16		
Brown-headed Cowbird	<i>Molothrus ater</i>			1	4.84
Gray-crowned Rosy Finch	<i>Leucosticte tephrocotis</i>			1	4.84
Pine Siskin	<i>Spinus pinus</i>	20	5.39		
Common Redpoll	<i>Acanthis flammea</i>	294	79.25		
Hoary Redpoll	<i>Acanthis hornemanni</i>	3	0.81		
TOTAL		1,926	519.14	85	411.62

The overall number of birds banded during 2013 was among the lowest years since the observatory began full scale operation during 2004. When considering the number of birds banded per 100 net hours, the 2013 value (53.8) was below the 2004-2013 average of 57.5 (Figure 2). Among the top 15 species banded in 2013, the majority were banded in below average numbers (Table 4). A small number of species were banded in near average numbers including Wilson’s Warbler, Fox Sparrow, Northern Waterthrush, Lincoln’s Sparrow, Ruby-crowned Kinglet and Savannah Sparrow. Two species, White-crowned Sparrow and Common Redpoll were banded in record numbers. With 394 and 294 individuals respectively, these species accounted for 34% of all birds banded in 2013.

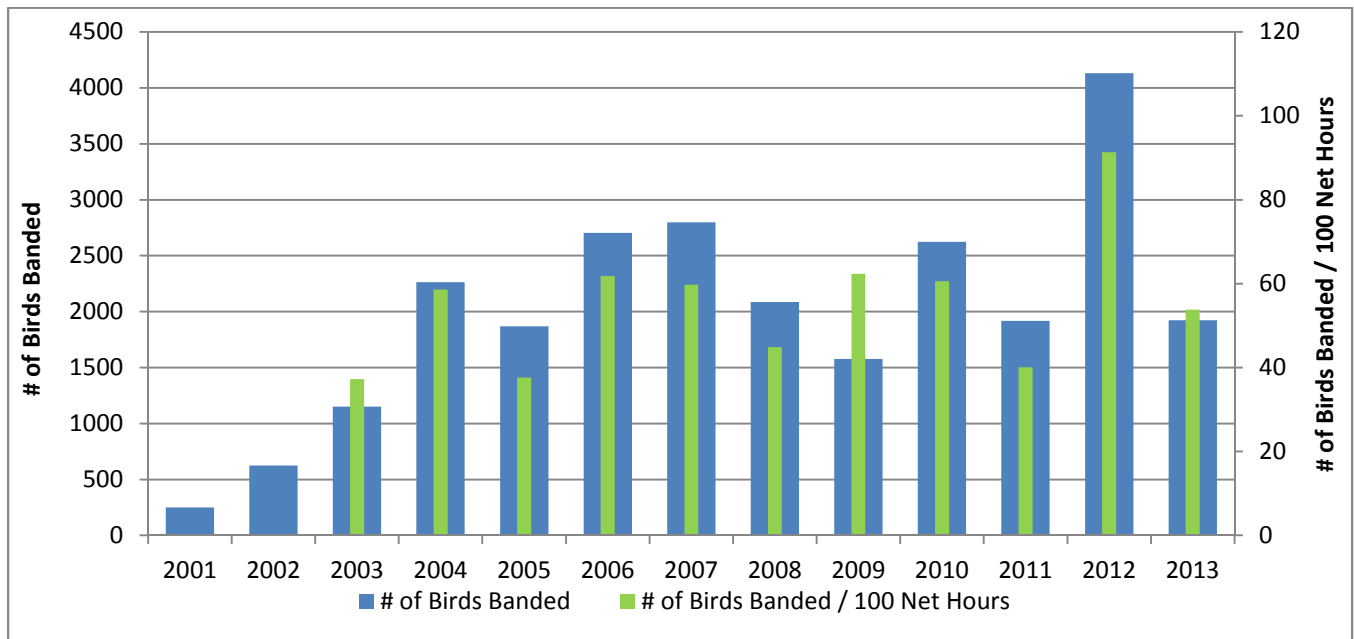


Figure 2. Summary of birds banded during spring at Albert Creek from 2001 to 2013.

Table 4. Comparison of the top 15 bird species banded in 2013 and compared to 2008 – 2012 (numbers in brackets represent annual rankings).

Species	2013	2012	2011	2010	2009	2008	2007	2007 – 2012 Average
White-crowned Sparrow	394 (1)	263 (5)	68 (11)	262 (2)	2009 data excluded due to the shortened season which is not comparable to other years	138 (5)	217 (6)	190
Common Redpoll	294 (2)	58 (18)	1 (39)	127 (7)		54 (9)	12 (24)	50
Wilson’s Warbler	228 (3)	259 (7)	125 (4)	249 (4)		182 (4)	369 (1)	237
Fox Sparrow	155 (4)	181 (9)	164 (3)	257 (3)		51 (11)	60 (13)	142
Northern Waterthrush	106 (5)	166 (10)	81 (9)	65 (9)		31 (15)	145 (7)	98
Slate-colored Junco	102 (6)	263 (5)	109 (6)	57 (12)		48 (12)	334 (3)	162
Lincoln’s Sparrow	101 (7)	193 (8)	66 (12)	60 (11)		27 (16)	120 (8)	93
Orange-crowned Warbler	78 (8)	288 (4)	75 (10)	177 (5)		339 (2)	251 (5)	226
Ruby-crowned Kinglet	72 (9)	94 (12)	40 (15)	42 (15)		88 (7)	75 (11)	68
Savannah Sparrow	63 (10)	41 (19)	85 (8)	49 (14)		53 (10)	70 (12)	59
American Tree Sparrow	61 (11)	571 (1)	63 (13)	136 (6)		74 (8)	345 (2)	238
Myrtle Warbler	61 (11)	571 (1)	217 (2)	776 (1)		434 (1)	113 (9)	422
Swainson’s Thrush	43 (13)	82 (14)	35 (16)	29 (16)		15 (19)	55 (15)	43
Common Yellowthroat	40 (14)	86 (13)	102 (7)	57 (13)		46 (14)	85 (10)	75
Yellow Warbler	23 (15)	485 (3)	334 (1)	65 (8)		208 (3)	261 (4)	271

Standard mist nets with the highest productivity were those within and adjacent to marsh habitats such as net 7 (Figure 3). This is presumably due to the edge habitats present in these areas which provide feeding opportunities and movement corridors within the marsh. The capture rates in nets 1 and 23 are influenced by high capture rates of sparrows early in the season when a small feeding station with baited ground traps is operated nearby. Mist nets are placed in various habitats to sample different species of birds despite lower overall capture rates; examples include nets 16 through 20 which are located in a mature forest. Net 27 is a non-standard net located on a boardwalk with the marsh and is intended to capture Rusty Blackbirds; however, various other species are captured including shorebirds and, in previous years, small numbers of ducks.

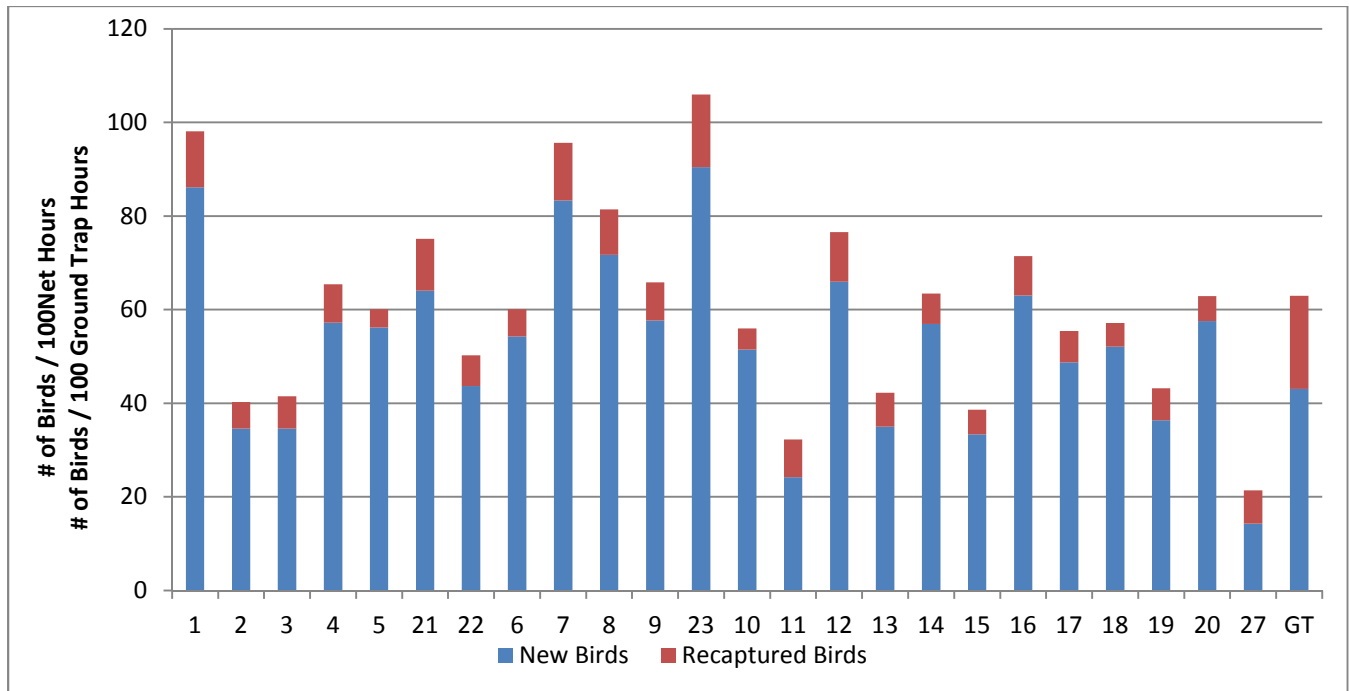


Figure 3. Number of birds banded per mist net/ground trap during the spring of 2013.

3.1 Migration Timing

The standardized monitoring at the observatory can be used to investigate the spring migration timing of numerous species. This section is separated into the following subsections: (3.1.1) generalized spring migration timing of species banded, and (3.1.2) species specific migration timing.

3.1.1 Generalized Migration Timing

Generalized spring migration timing during 2013 and the average of 2010-2012 for temperate, neotropical and irruptive migrants/residents is shown in Figure 4. The delayed arrival of temperate migrants (primarily sparrows) is evident by the delayed banding totals for these species in 2013 as compared to previous years.

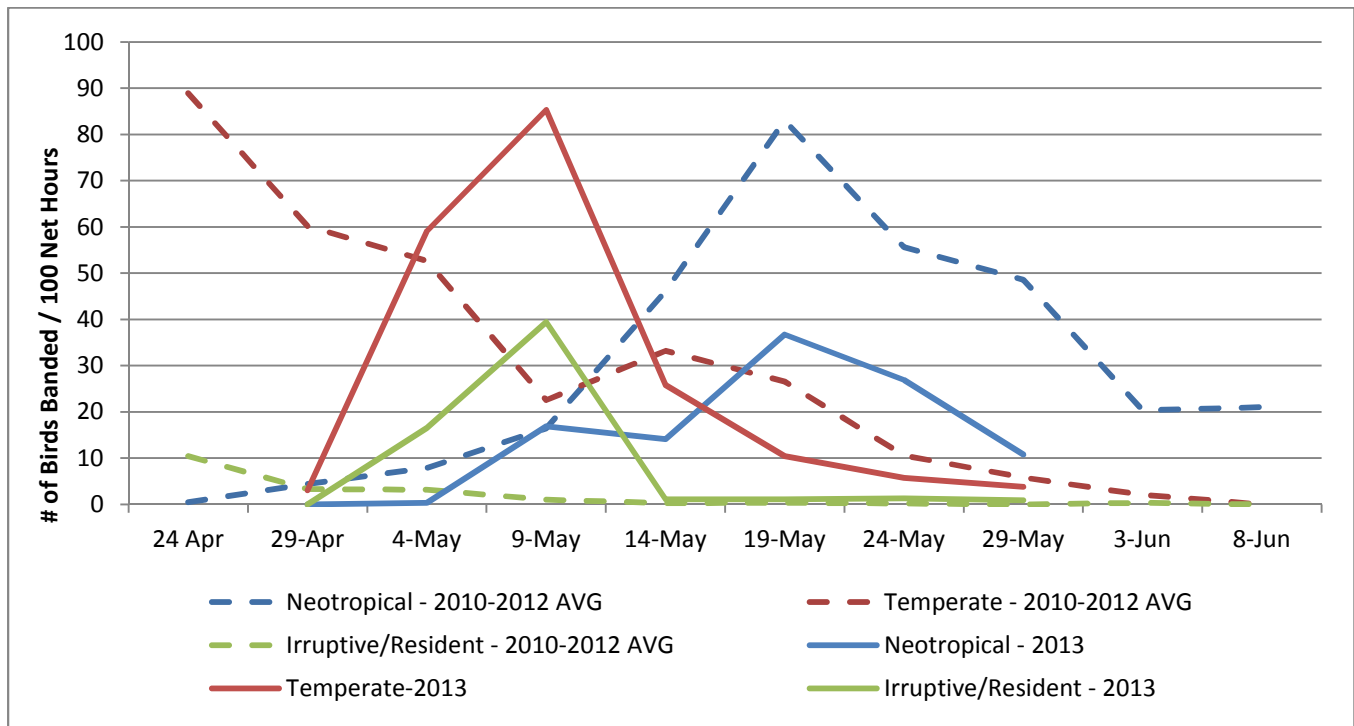


Figure 4. Generalized migration timing for neotropical migrants, temperate migrants and irruptive/resident species in the spring of 2013 as compared to the average of 2010-2012.

Spring arrival dates for species encountered in sufficient numbers can also be used to make general migration timing comparisons between years; spring arrival dates for 22 species are shown in Table 6. This data shows that most species arrived later than average in 2013. Of the 22 species shown, 6 species arrived earlier than average, 12 species arrived later and 2 species arrived on the average date. The most notable late arrivals were Orange-crowned Warbler and Yellow-rumped Warbler which had the latest arrivals to date and were 9 and 11 days later than average, respectively. The most notable earlier arrivals were Warbling Vireo, Swainson’s Thrush and Blackpoll Warbler which arrived 3, 3, and 4 days earlier than average.

Table 5. Summary of arrival dates for frequently observed species at Albert Creek.

Species	2013	2012	2011	2010	2009	2008	2007	2006	2006 to 2011 Average Arrival Date
<i>Station Opening Date</i>	<i>23-Apr</i>	<i>21-Apr</i>	<i>24-Apr</i>	<i>22-Apr</i>	<i>11-May</i>	<i>24-Apr</i>	<i>23-Apr</i>	<i>23-Apr</i>	
Solitary Sandpiper	9-May	7-May	3-May	10-May	-	12-May	11-May	4-May	8-May
Yellow-bellied Sapsucker	15-May	1-May	6-May	24-Apr	-	9-May	2-May	24-Apr	1-May
Alder Flycatcher	25-May	21-May	20-May	26-May	21-May	26-May	23-May	23-May	23-May
Least Flycatcher	24-May	25-May	18-May	29-May	4-Jun	26-May	22-May	23-May	25-May
Hammond's Flycatcher	11-May	1-May	13-May	2-May	-	12-May	14-May	7-May	9-May
Warbling Vireo	16-May	21-May	21-May	16-May	21-May	20-May	19-May	20-May	19-May
Gray-cheeked Thrush	21-May	15-May	-	15-May	23-May	16-May	11-May	14-May	15-May
Swainson's Thrush	10-May	3-May	10-May	16-May	19-May	11-May	11-May	14-May	13-May
Tennessee Warbler	24-May	22-May	16-May	24-May	26-May	25-May	24-May	23-May	23-May
Orange-crowned Warbler	8-May	1-May	6-May	24-Apr	-	3-May	28-Apr	26-Apr	29-Apr
Yellow Warbler	17-May	15-May	15-May	17-May	20-May	18-May	18-May	14-May	17-May
Cape May Warbler	24-May	28-May	26-May	30-May	26-May	26-May	28-May	1-Jun	28-May
Yellow-rumped Warbler	6-May	21-Apr	30-Apr	21-Apr	-	30-Apr	23-Apr	24-Apr	25-Apr
Blackpoll Warbler	10-May	13-May	10-May	15-May	23-May	9-May	16-May	14-May	14-May
American Redstart	25-May	22-May	21-May	26-May	29-May	27-May	27-May	27-May	26-May
Northern Waterthrush	8-May	7-May	9-May	10-May	-	10-May	5-May	7-May	8-May
Common Yellowthroat	16-May	13-May	15-May	13-May	20-May	10-May	11-May	15-May	14-May
Wilson's Warbler	7-May	30-Apr	8-May	10-May	-	3-May	11-May	6-May	7-May
Savannah Sparrow	6-May	24-Apr	3-May	29-Apr	-	29-Apr	23-Apr	27-Apr	28-Apr
Swamp Sparrow	23-May	3-May	16-May	5-May	22-May	9-May	5-May	12-May	11-May
White-throated Sparrow	18-May	8-May	15-May	1-May	18-May	10-May	15-May	7-May	11-May
Red-winged Blackbird	12-May	23-Apr	3-May	27-Apr	-	3-May	3-May	28-Apr	30-Apr

3.1.2 Species Specific Spring Migration Timing

Species specific spring migration timing was analyzed for 15 species using the mist netting captures and effort (Figures 5 - 19). Migration timing figures were compiled by grouping data over 5 day intervals and standardized to a number of birds banded per 100 net hours; the species analyzed include the following;

- Ruby-crowned Kinglet
- Swainson’s Thrush
- Northern Waterthrush
- Tennessee Warbler
- Orange-crowned Warbler
- Common Yellowthroat
- Yellow Warbler
- Myrtle Warbler
- Wilson’s Warbler
- American Tree Sparrow
- Savannah Sparrow
- Fox Sparrow
- Lincoln’s Sparrow
- White-crowned Sparrow
- Slate-colored Junco

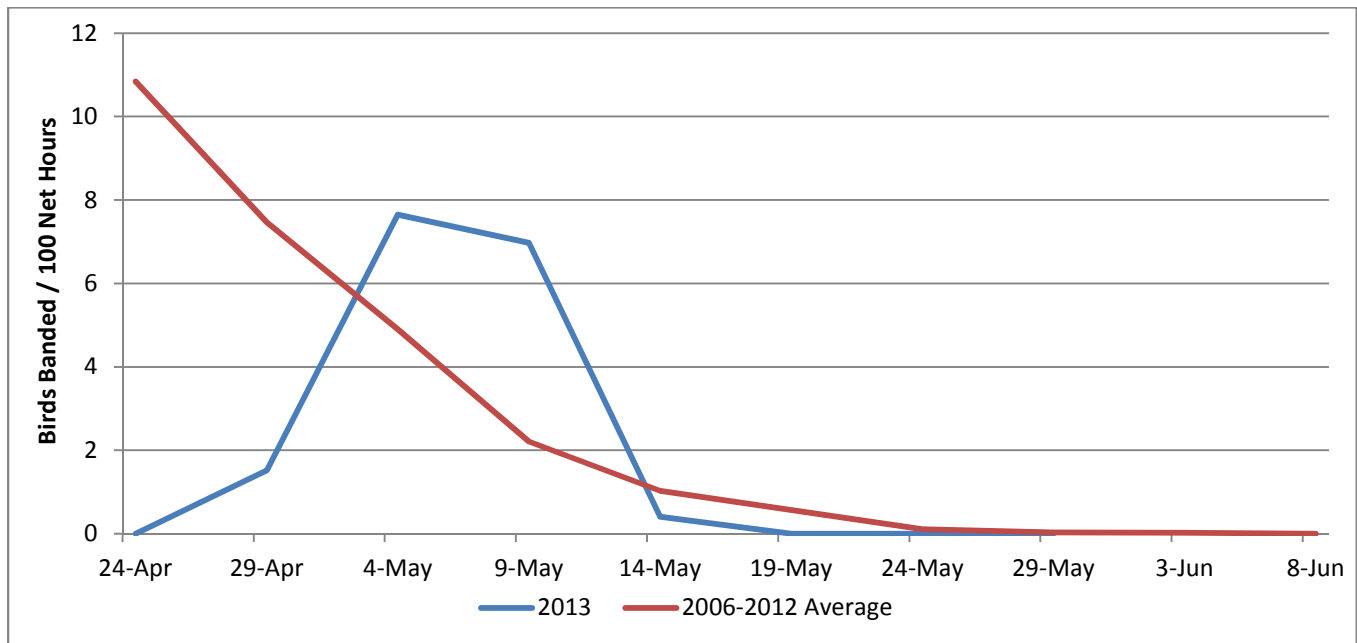


Figure 5. Ruby-crowned Kinglet migration timing in 2013 as compared to the 2006-2012 average.

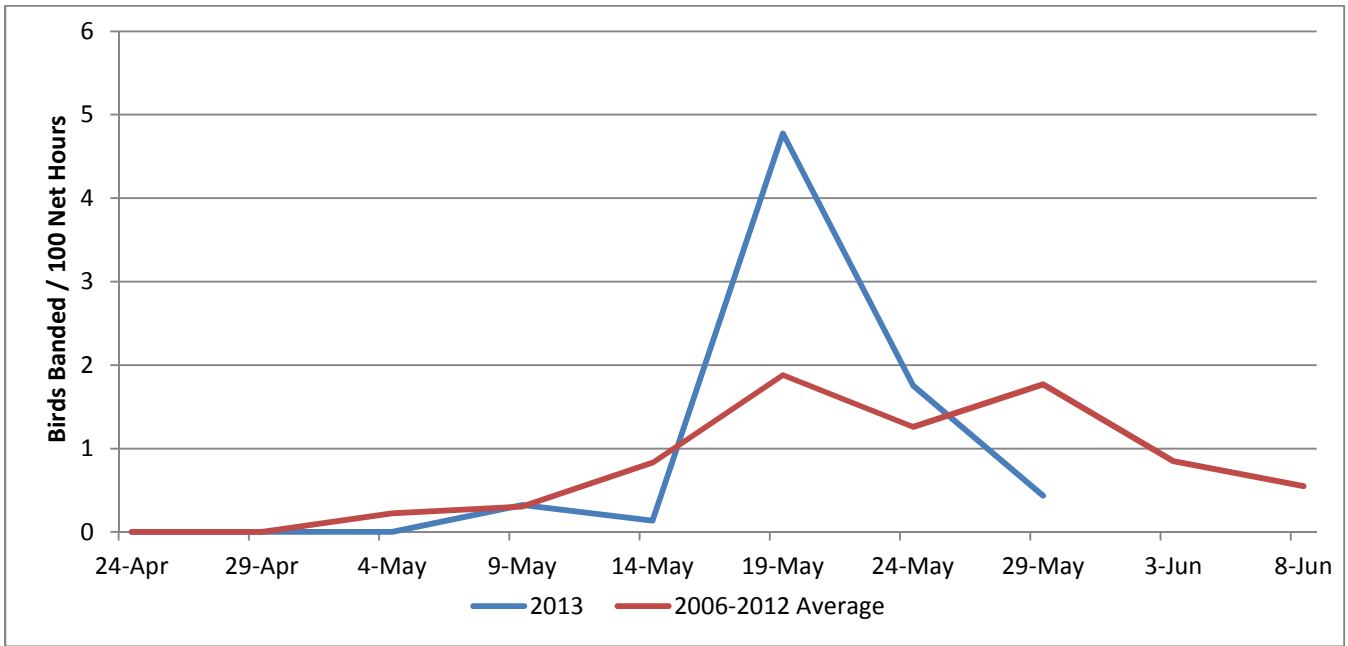


Figure 6. Swainson's Thrush migration timing in 2013 as compared to the 2006-2012 average.

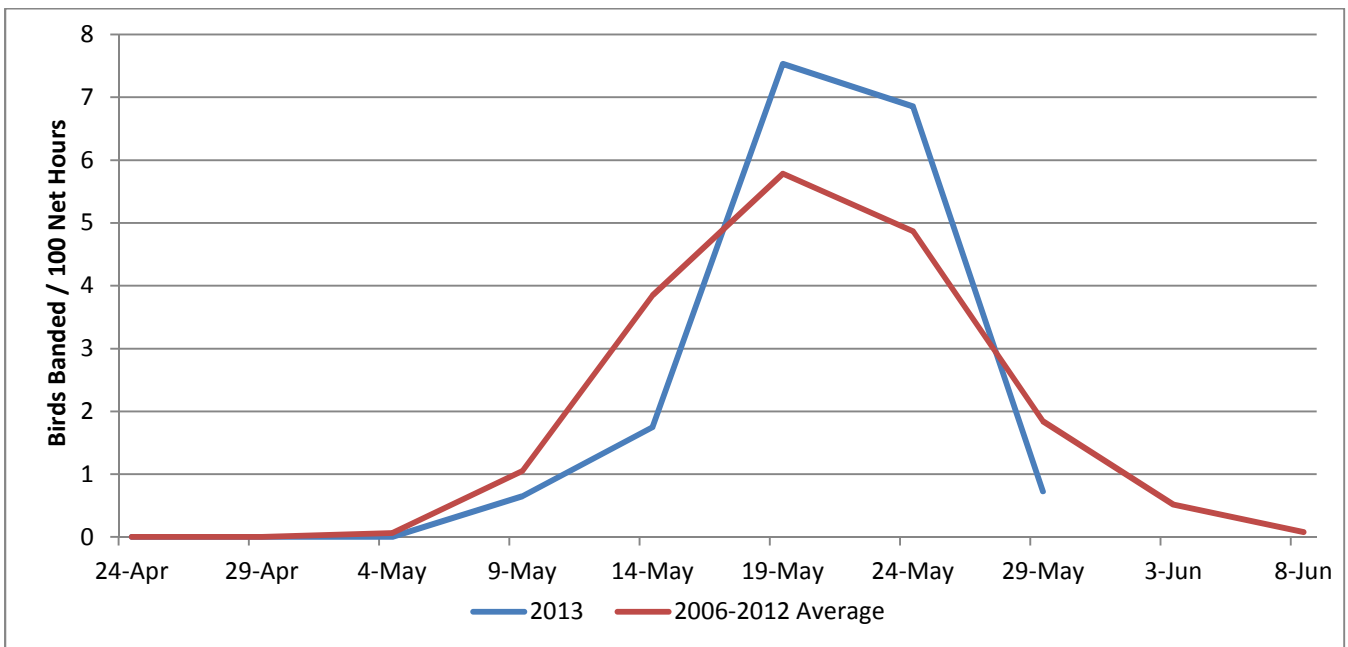


Figure 7. Northern Waterthrush migration timing in 2013 as compared to the 2006-2012 average.

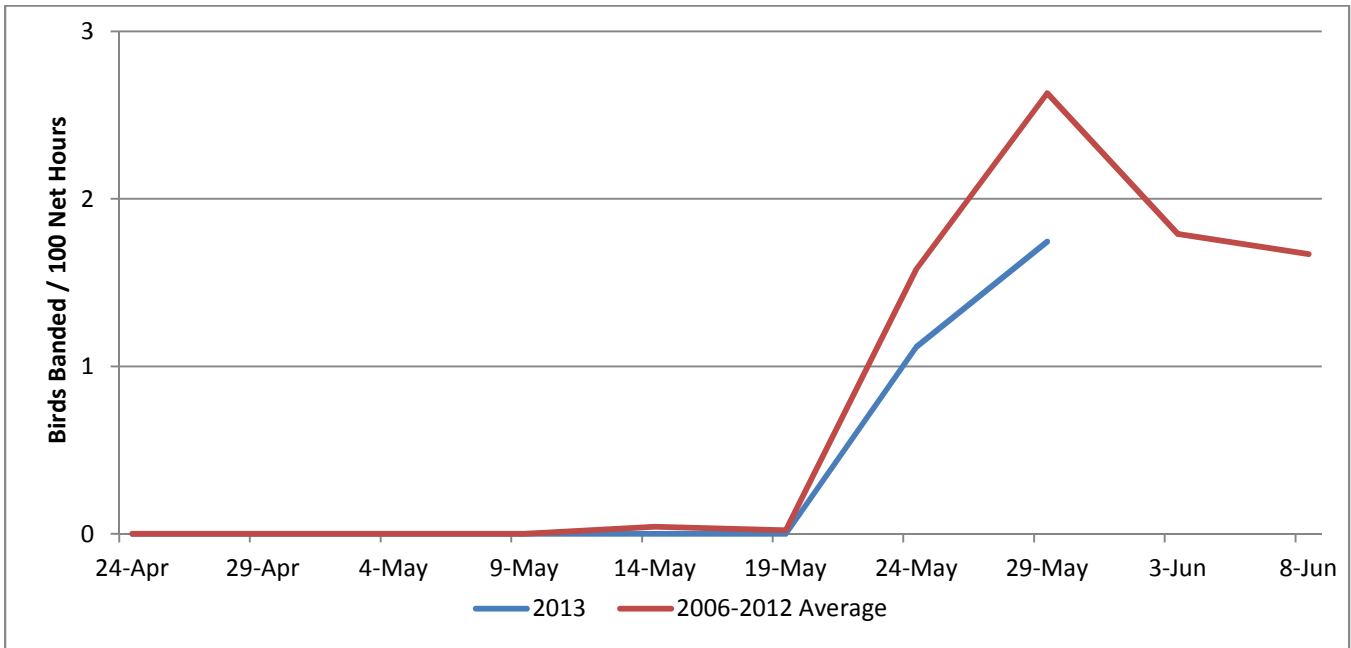


Figure 8. Tennessee Warbler migration timing in 2013 as compared to the 2006-2012 average.

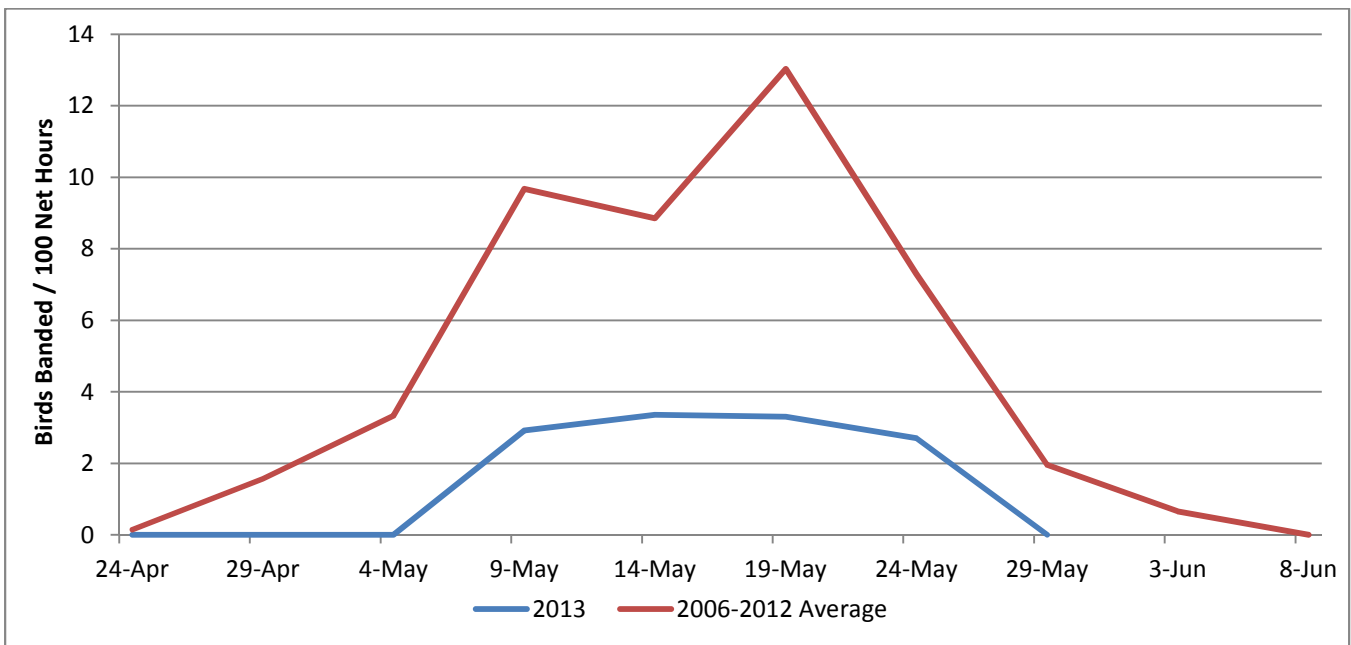


Figure 9. Orange-crowned Warbler migration timing in 2013 as compared to the 2006-2012 average.

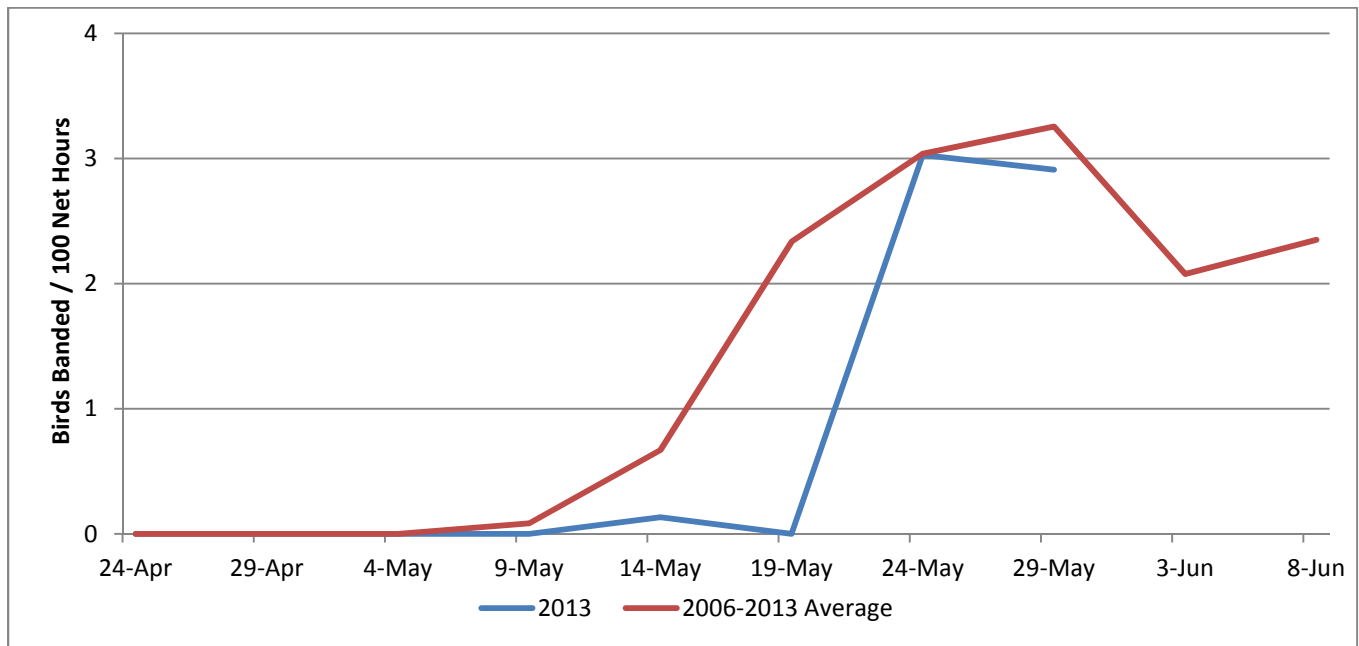


Figure 10. Common Yellowthroat migration timing in 2013 as compared to the 2006-2012 average.

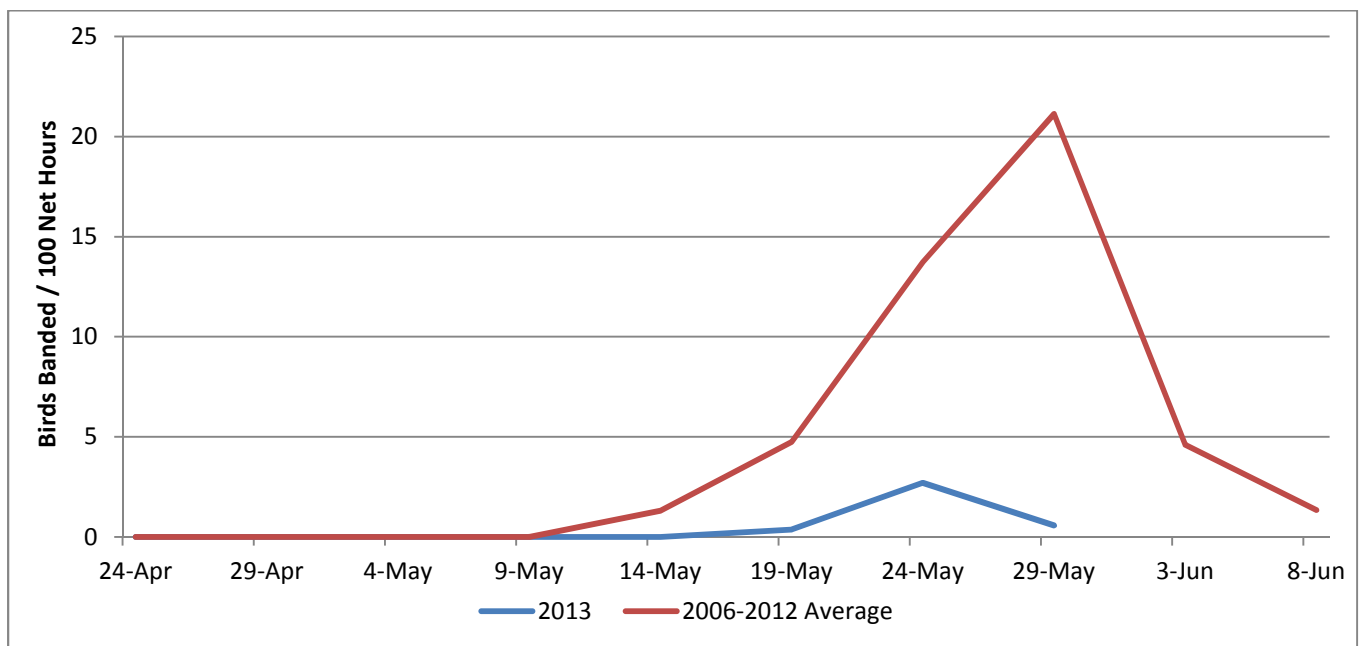


Figure 11. Yellow Warbler migration timing in 2013 as compared to the 2006-2012 average.

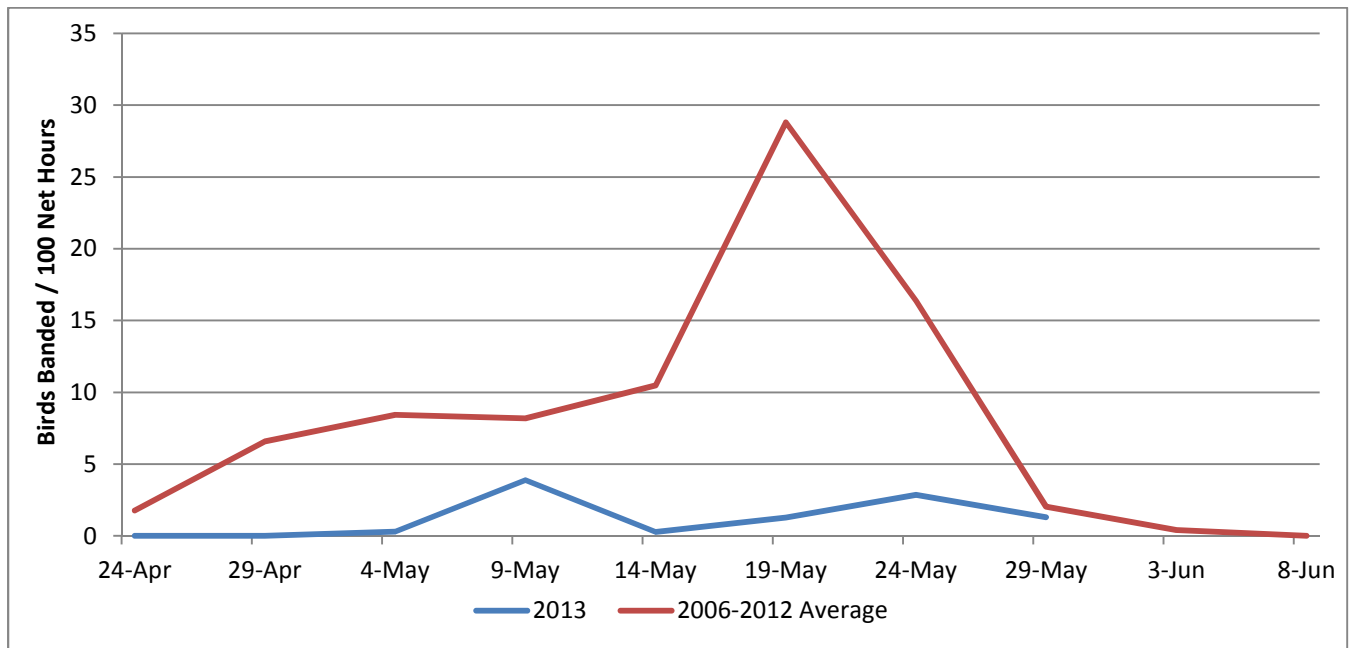


Figure 12. Myrtle Warbler migration timing in 2013 as compared to the 2006-2012 average.

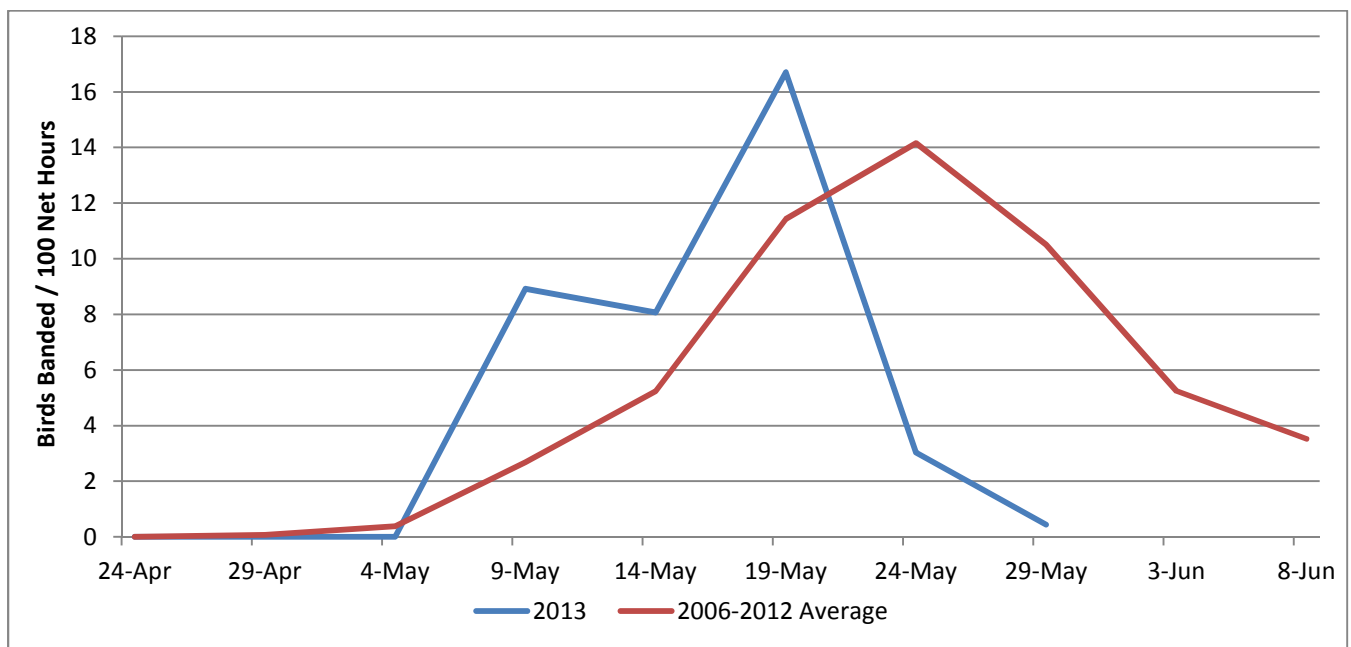


Figure 13. Wilson's Warbler migration timing in 2013 as compared to the 2006-2012 average.

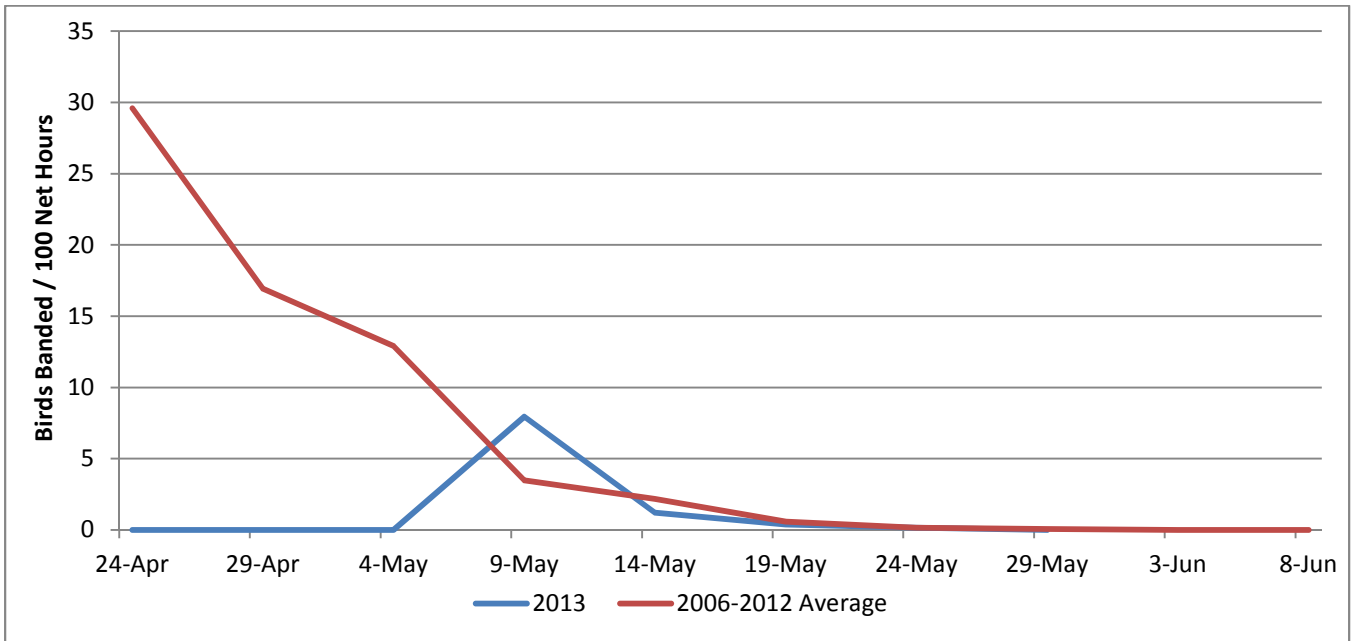


Figure 14. American Tree Sparrow migration timing in 2013 as compared to the 2006-2012 average.

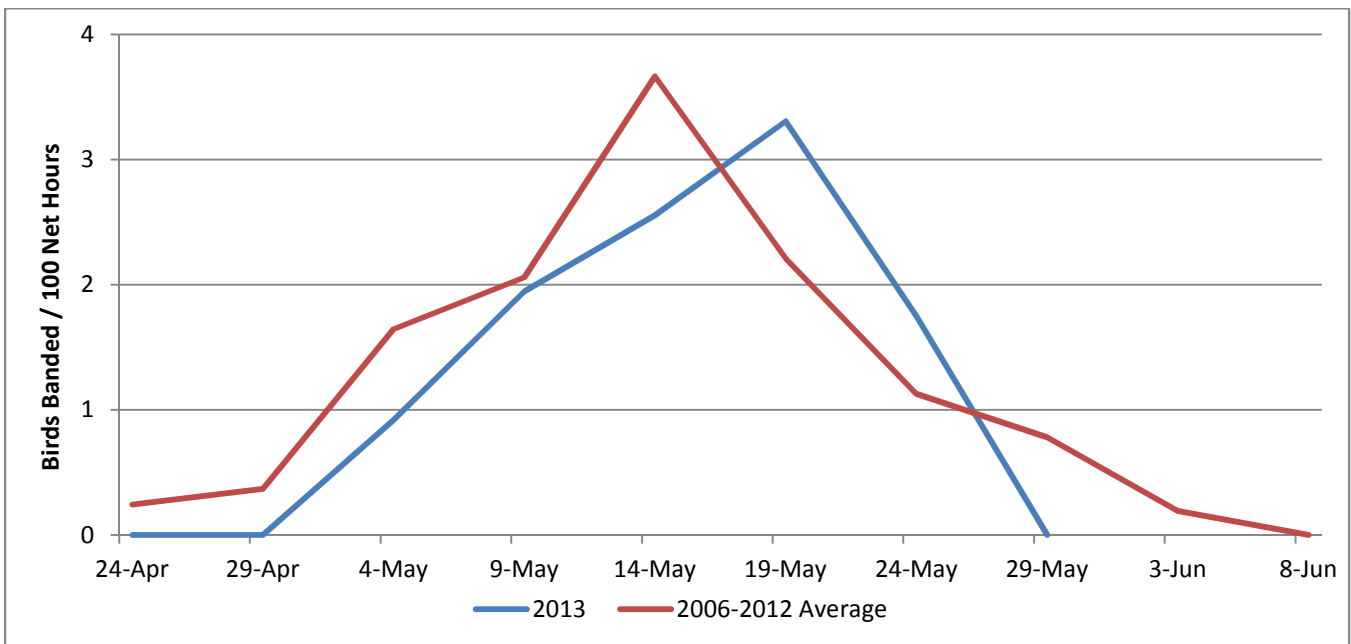


Figure 15. Savannah Sparrow migration timing in 2013 as compared to the 2006-2012 average.

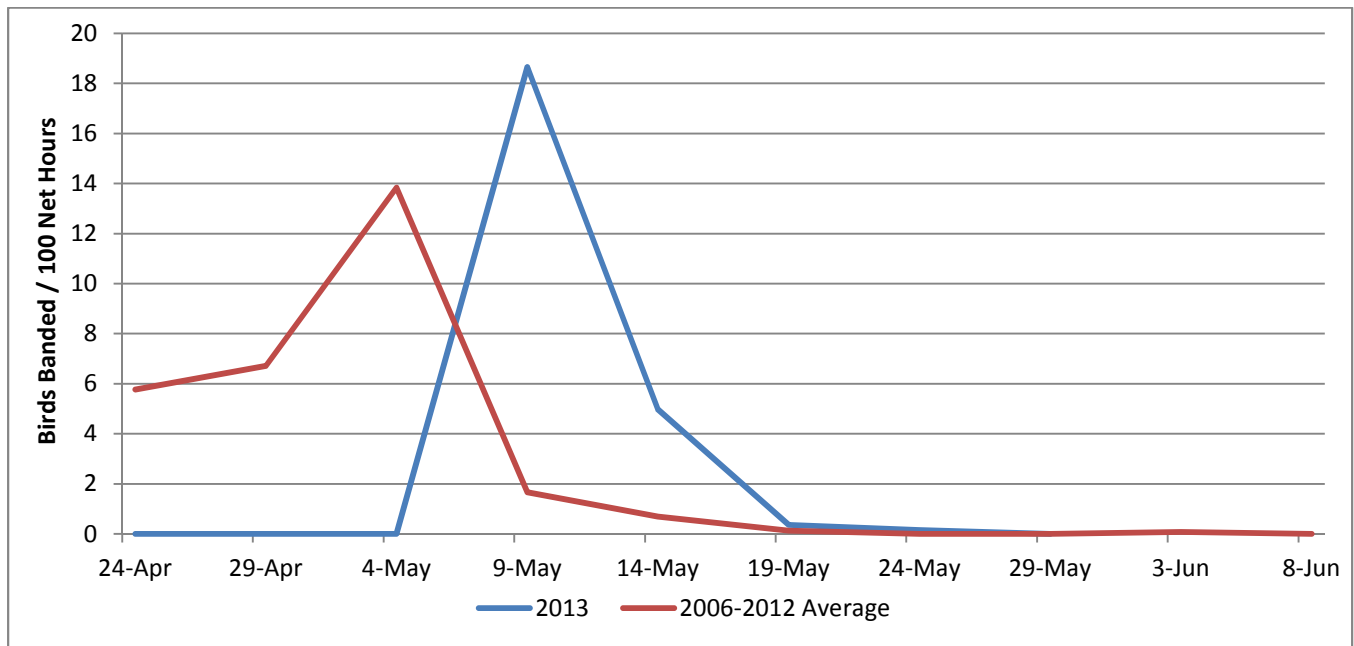


Figure 16. Fox Sparrow migration timing in 2013 as compared to the 2006-2012 average.

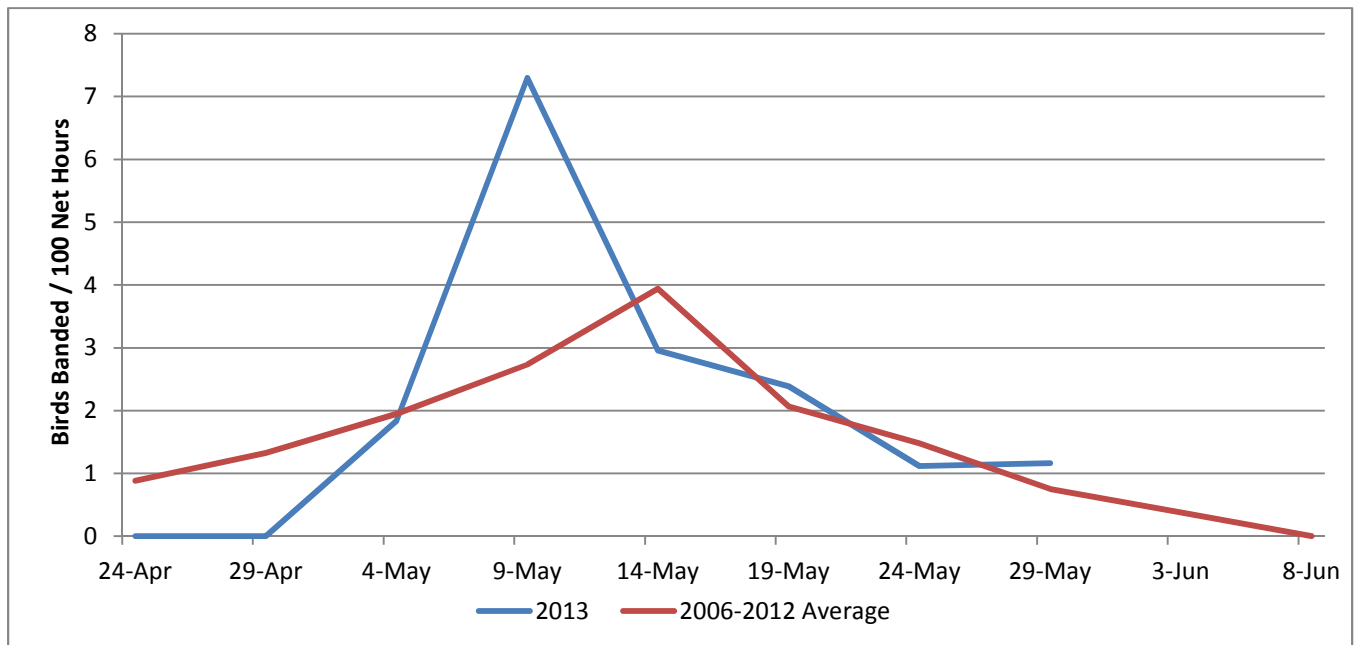


Figure 17. Lincoln's Sparrow migration timing in 2013 as compared to the 2006-2012 average.

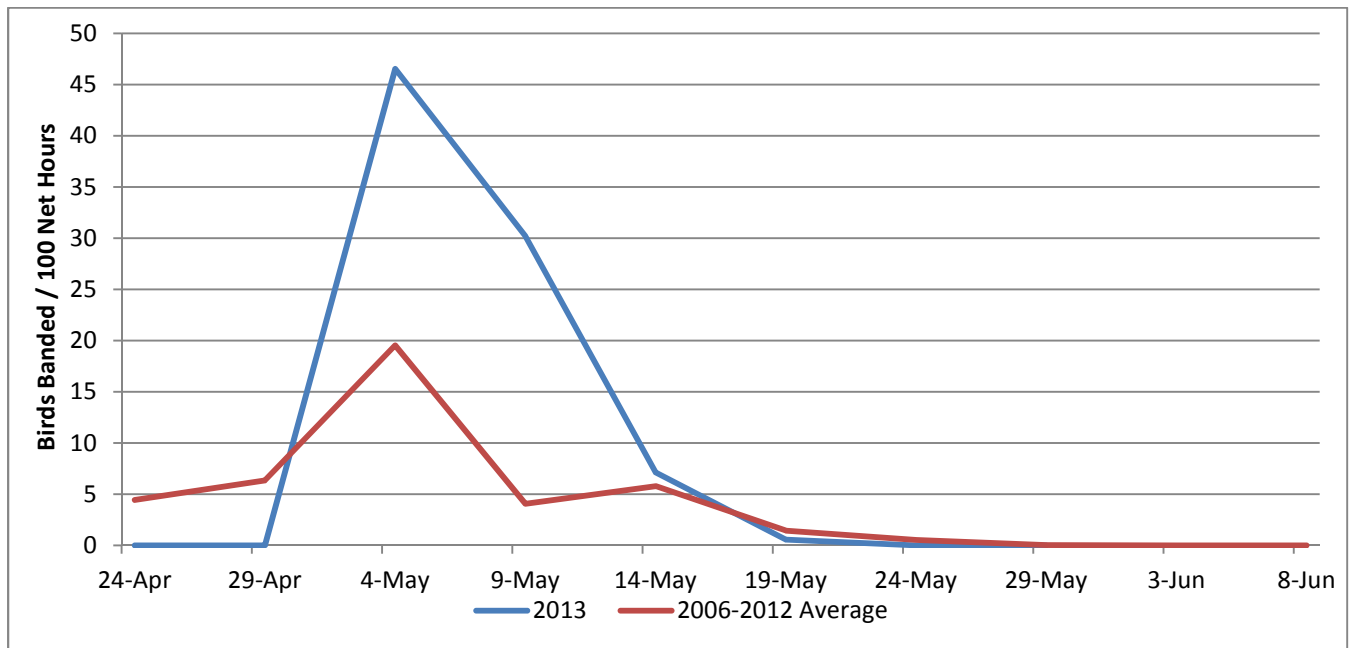


Figure 18. White-crowned Sparrow migration timing in 2013 as compared to the 2006-2012 average.

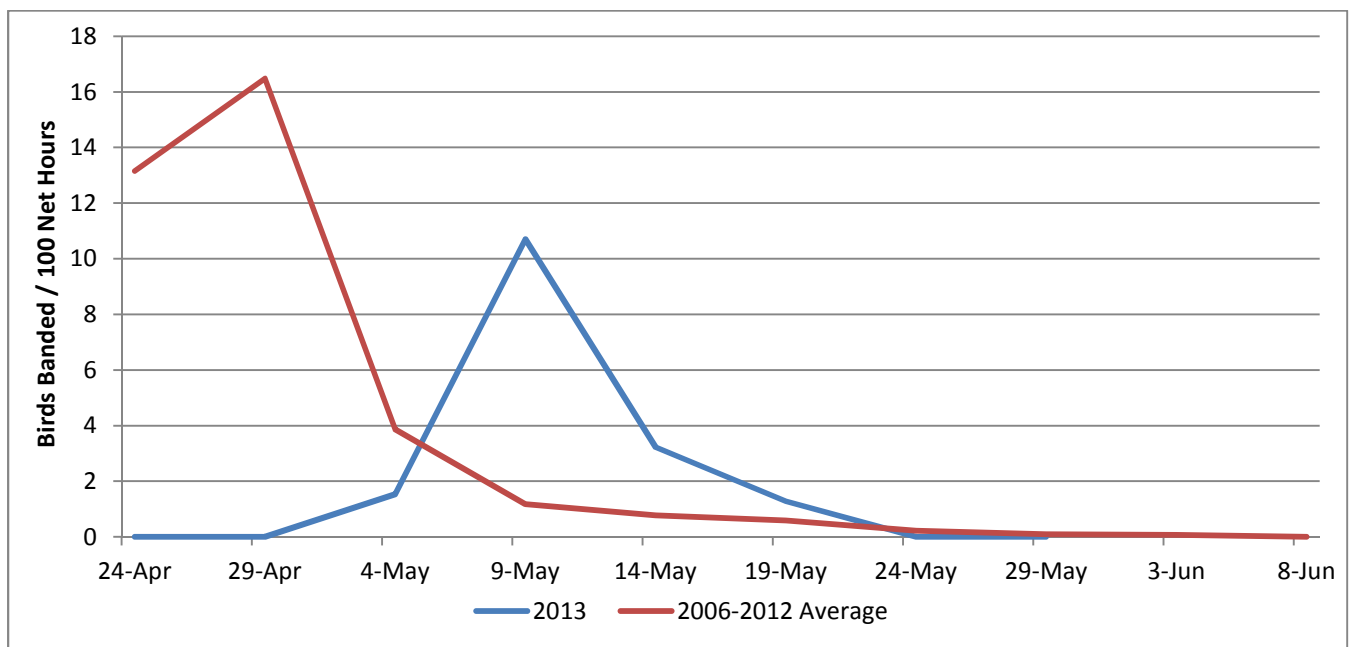


Figure 19. Slate-colored Junco migration timing in 2013 as compared to the 2006-2012 average.

3.2 Band Repeats, Returns & Recoveries

The proportion of band repeats during the spring season was 8.6 % overall with Savannah Sparrow having the highest proportion of repeats (25.4 %) among the common migrants banded (Table 6). The overall proportion of band repeats during 2013 was lower than during previous years.

Table 6. Summary of band repeats during the spring 2013 season.

Species	Spring	
	# of Individuals Recaptured	% of 2013 Original Bandings
Yellow-bellied Sapsucker	2	40.0
Gray Jay	1	33.3
Black-capped Chickadee	1	100.0
Ruby-crowned Kinglet	1	1.4
American Robin	1	6.7
Northern Waterthrush	7	6.6
Tennessee Warbler	1	5.3
Orange-crowned Warbler	2	2.6
Common Yellowthroat	5	12.5
Yellow Warbler	2	8.7
Yellow-rumped ' Myrtle' Warbler	3	4.9
Wilson's Warbler	25	11.0
American Tree Sparrow	10	16.4
Chipping Sparrow	1	25.0
Fox Sparrow	10	6.5
Lincoln's Sparrow	12	11.9
Swamp Sparrow	1	33.3
White-crowned Sparrow	48	12.2
Golden-crowned Sparrow	1	6.7
White-throated Sparrow	2	9.1
Savannah Sparrow	16	25.4
Slate-colored Junco	10	9.8
Rusty Blackbird	1	12.5
Common Redpoll	8	2.7
Pine Siskin	2	10.0
ALL SPECIES	173	8.6

Band returns (individuals banded at the site in previous years) typically represent individuals that breed within the study site as the likelihood of re-trapping migrants is relatively low. During the 2013 spring season, the observatory had 35 returns of birds banded in previous years representing 16 species (Table 7). The early closing date during the 2013 season likely reduced the overall number of band returns given that most returns are recaptured late in the season.

The oldest band return was a Black-capped Chickadee originally banded at the site on September 1, 2005; this bird is at least 9 years old as of 2013. Species well represented in the band returns, such as Warbling Vireo, Northern Waterthrush and Common Yellowthroat are some of the most common

breeding birds at Albert Creek. Many of the band returns represent individuals which have been recaptured at the site on a number of occasions in previous years.

Table 7. Summary of band returns during the spring 2013 season.

Species	Band Number	Banded		Recaptured
		Date	Age – Sex ¹	Date
Sharp-shinned Hawk	1013-51160	21 Aug 2012	AHY-M	30 May 2013
Solitary Sandpiper	2231-27462	24 May 2012	AHY-U	17 May 2013
Yellow-bellied Sapsucker	2231-27082	21 May 2011	SY-F	24 May 2013
Yellow-bellied Sapsucker	2231-27451	13 May 2012	SY-F	21 May 2013
Warbling Vireo	2650-56045	2 Jun 2011	SY-U	25 May 2013
Warbling Vireo	2650-56078	23 Jul 2011	AHY-U	28 May 2013
Warbling Vireo	2650-54006	30 Jul 2011	AHY-U	30 May 2013
Tree Swallow	2600-08895	15 May 2010	AHY-M	24 May 2013
Tree Swallow	2221-70960	21 May 2012	AHY-M	15 May 2013
Black-capped Chickadee	2400-24299	1 Sep 2005	U-U	12 May 2013
Black-capped Chickadee	2640-17148	25 Jul 2010	HY-U	12 May 2013
Black-capped Chickadee	2650-56255	26 Jul 2011	HY-U	12 May 2013
Boreal Chickadee	2400-77070	28 Jul 2010	HY-U	6 May 2013
Boreal Chickadee	2650-46308	6 May 2011	SY-U	15 May 2013
Boreal Chickadee	2650-55234	28 Apr 2012	AHY-U	7 May 2013
Boreal Chickadee	2650-55877	13 May 2012	AHY-M	15 May 2013
Hermit Thrush	2341-68186	30 May 2010	SY-U	14 May 2013
Swainson's Thrush	2261-80117	25 May 2012	SY-U	24 May 2013
American Robin	1292-04560	25 May 2012	ASY-M	29 May 2013
Northern Waterthrush	2640-17066	30 May 2010	SY-U	27 May 2013
Northern Waterthrush	2400-77209	9 Aug 2010	AHY-U	31 May 2013
Northern Waterthrush	2650-56227	25 Jul 2011	AHY-U	30 May 2013
Northern Waterthrush	2730-84605	23 May 2012	SY-U	27 May 2013
Northern Waterthrush	2730-84664	25 May 2012	ASY-U	29 May 2013
Northern Waterthrush	2730-86404	7 Aug 2012	HY-U	29 May 2013
Yellow-rumped 'Myrtle' Warbler	2730-84434	22 May 2012	SY-M	23 May 2013
Yellow-rumped 'Myrtle' Warbler	2730-86348	4 Jun 2012	ASY-M	29 May 2013
Common Yellowthroat	2430-39944	31 Jul 2006	HY-U	24 May 2013
Common Yellowthroat	2600-08100	26 Aug 2009	AHY-M	27 May 2013
Common Yellowthroat	2650-56290	28 Jul 2011	SY-M	26 May 2013
Common Yellowthroat	2730-84443	22 May 2012	SY-M	26 May 2013
Lincoln's Sparrow	2221-70976	23 May 2012	AHY-U	25 May 2013
White-throated Sparrow	2341-67873	1 Jun 2011	SY-U	28 May 2013
White-throated Sparrow	2261-80163	19 Aug 2012	HY-U	30 May 2013
White-crowned Sparrow	2261-80194	1 Sep 2012	AHY-U	23 May 2013

¹ AHY – after hatch year, SY – second year, ASY – after second year, HY – hatch year; M – male, F – Female, U – unknown.

Foreign band recoveries are a very infrequent event and to date there have been four foreign band recoveries of birds banded at Albert Creek;

- Hatch year male Yellow-rumped Warbler banded on July 26, 2010 and recovered near Colfax, Louisiana on November 2, 2010.
- After hatch year male Yellow-rumped Warbler banded on May 1, 2005 and recovered near Mehanga, Minnesota on April 27, 2006.
- Hatch year Pine Siskin banded on August 22, 2011 and recovered in Bottrel, Alberta on May 19, 2012.
- Hatch year Pine Siskin banded on July 17, 2010 and recovered near Portland, Oregon on April 4, 2012.

3.3 Interesting & Notable Captures / Observations

The vast majority of birds banded and observed at Albert Creek are species which are common and widespread north and west of the study site. As the observatory operates on a daily basis during the migration season, there are often a number of interesting and notable species captured and/or observed at the site. The following section summarizes these during 2013 as well as the occurrence of the species not regularly found farther west and north in the Yukon than Albert Creek.

Sora

Sora is the only species of rail recorded in the Yukon and is uncommon at productive wetlands, primarily in the southern portion of the territory. In the spring of 2013, this species was observed on 5 days from May 27 to 31 with 2 birds observed on many days, thus indicating that local breeding was likely during 2013. The numbers observed appear to be variable between years; however, the numbers recorded in 2013 were near average but well below the high of 25 bird days during 2011. To date, the earliest and latest records for this species at Albert Creek are May 2 (2012) and September 9 (2007).

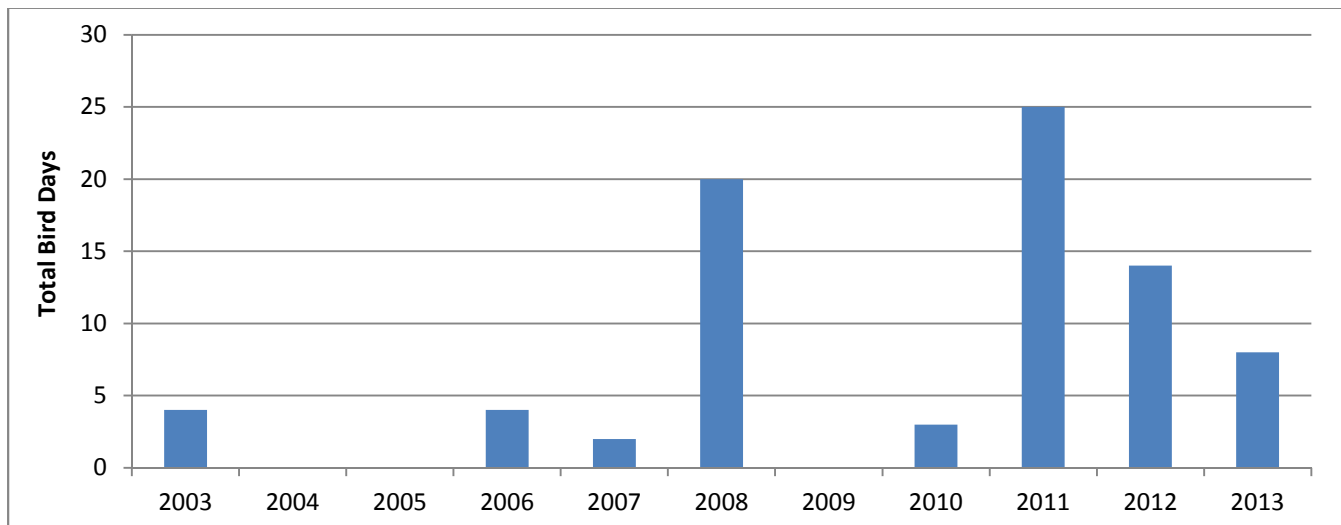


Figure 20. Summary of Sora records at Albert Creek during the spring season from 2003 to 2013.

Eurasian Collared Dove

Originally from Europe, this species was first introduced to the New World in the Bahamas during the 1970s. Since then the species has spread rapidly throughout much of North America, primarily due to the presence of human altered habitats. This species was first documented in the Yukon at Haines Junction during 2006. Since then, it has become more common and is now reported annually and considered rare. The species was first observed at Albert Creek during 2013 when a single bird was observed on May 28.

Barred Owl

The Yukon’s first Barred Owl was documented at Albert Creek during the spring season of 2010 when it was heard on 20 days between April 20 and June 4 and also on August 26. In 2012, a singing individual was heard on 31 days from April 23 to June 5 and also on one day during the fall (August 28). Once again during 2013, a singing individual was observed on 19 days from May 10 to 29. As incidental observations, two Barred Owls were heard calling back and forth at Albert Creek on August 6 by bird observatory personnel and again on September 1.

Pileated Woodpecker

The least common woodpecker in the Yukon, Pileated Woodpecker is restricted to the southeast portion of the territory. This species has been observed annually since 2003 with the exception of 2010 and has been less common in recent years (Figure 21). The species was observed on 3 days in 2013 from April 29 to May 6 with single birds on all days.

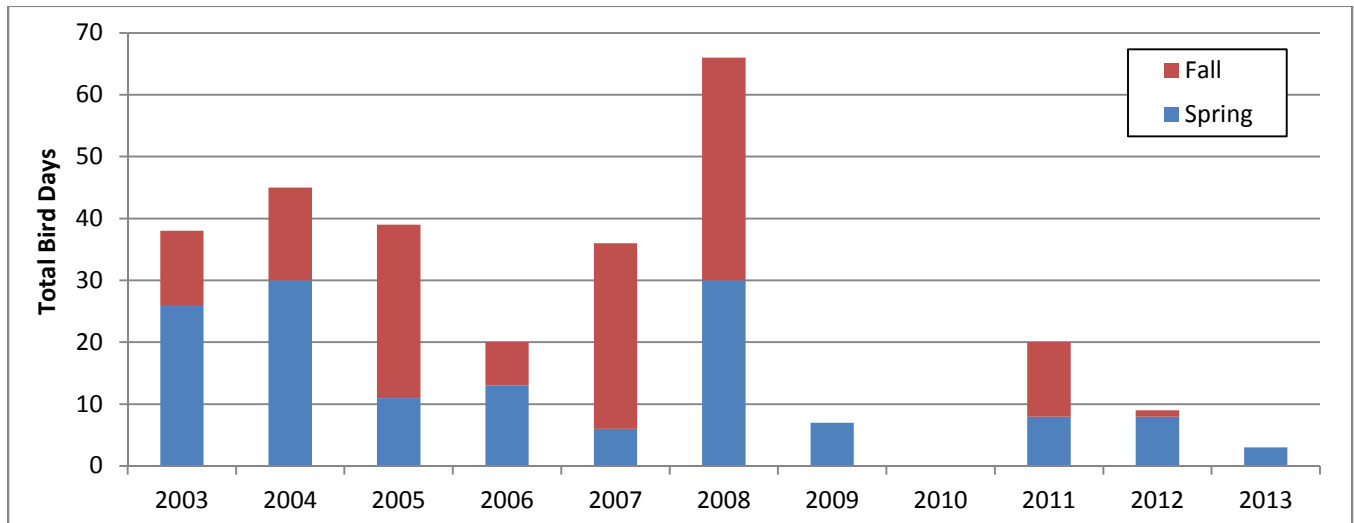


Figure 21. Summary of Pileated Woodpecker records at Albert Creek from 2003 to 2013 (note – the station was not operated during the fall of 2013 and in a limited capacity only during the fall of 2012).

Blue-headed Vireo

With a range typically restricted to the southeast Yukon, Blue-headed Vireo is observed infrequently at Albert Creek. Although not banded in 2013, a single individual was observed on May 27. A total of 16 individuals have been banded to date (all in fall) to date including: 2 in 2003, 6 in 2004, 4 in 2005, 2 in 2006, 1 in 2007 and 1 in 2011. There are also a limited number of spring records including a single male at the observatory at the end of May 2012.

American Crow

American Crow appears to be increasing in numbers in the Yukon and is now regularly encountered at a number of locations near Albert Creek, including the town of Watson Lake, Watson Lake airport and Upper Liard. In 2012, this species was encountered on 6 days from April 27 to May 28 with single birds observed on all days with the exception of May 7, when two birds were observed.

Mountain Bluebird

Mountain Bluebird is an uncommon breeding species in open and dry habitat in the south-western and south-central portion of the Yukon becoming much more rare towards the east and north. Considering the scarcity of the species at Watson Lake area and the lack of suitable habitat at Albert Creek, it is not entirely surprising that the observation of 4 individuals flying over the site on May 3, 2013 was the first record for the site.

Cape May Warbler

The Cape May Warbler's Yukon range is primarily restricted to the southeast portion of the territory. In recent years, this species has become more common at Albert Creek and local breeding is likely given the presence of singing males on territory. Records during 2013 included a total of 12 bird days from May 24 to May 31 with 1 to 2 singing males heard on each day. The arrival date in 2013 (May 24) tied the previous early record date for this species established in 2007. Although not banded in 2013, a total of 15 individuals have been banded to date 60% of which have been banded in fall.

Black-and-white Warbler

Another species typically only found in the southeast portion of the territory, Black-and-white Warbler is one of the least common warbler species encountered at Albert Creek. In 2013, a single individual was observed on May 26. This species has been banded sporadically in previous years including: May 21 (2006, 2007), May 26 (2012), May 31 (2009), June 4 (2003) and August 4 (2005).

Ovenbird

Typically only found in the southeast portion of the territory, Ovenbird is one of the least common warbler species encountered at Albert Creek. In 2012, one individual was banded on May 28; previous individuals have been banded on May 25 (2012), May 29 (2003) and August 20 (2006). One Ovenbird was heard singing at the site on June 1.

Swamp Sparrow

In most of the Yukon, Swamp Sparrow is rare; however, it is a regular breeding species in the southeast portion of the territory (and a highly probable breeder at Albert Creek). In the spring of 2013, single individuals were banded on May 24, 26 and 28. When birds banded and observations are combined, this species was encountered on 9 days from May 23 to 31 with a high count of 5 birds on May 28. This species is a late spring migrant and it is possible that a large proportion of individuals arrive after the

station has closed for the spring season. Of the 247 individuals banded to date, 83% have been banded in fall. The earliest and latest records of this species at the observatory to date are April 27 (2005) and September 21 (2006).

White-throated Sparrow

This species is observed infrequently in most of the Yukon, but is a regular breeder in the southeast Yukon as far west as the Rancheria area. In 2013, a total of 22 birds were banded and when this data is combined with observation data, a total of 82 bird days were recorded and the species was encountered on 13 days from May 18 to 31 with a high count of 17 on May 30. Of the 397 individuals banded at Albert Creek to date, 45% have been banded in spring. The earliest and latest records of this species are May 1 (2010) and September 21 (2008).

The spring mist netting data suggests that the capture rates of White-throated Sparrows are variable at Albert Creek. Prior to 2013, it appeared as though there may be a decreasing trend in the number banded; however, the number banded per 1,000 net hours during 2013 was the highest recorded since the station began full operation in 2003. The individuals captured at Albert Creek represent a mixture of local breeders and migrants. Preliminary data from Roadside BBS (Breeding Bird Survey) routes in the Watson Lake area indicate that this species may be increasing in the region. This is possibly due to an increased frequency and size of forest fires in the region which create suitable breeding habitat for this species.

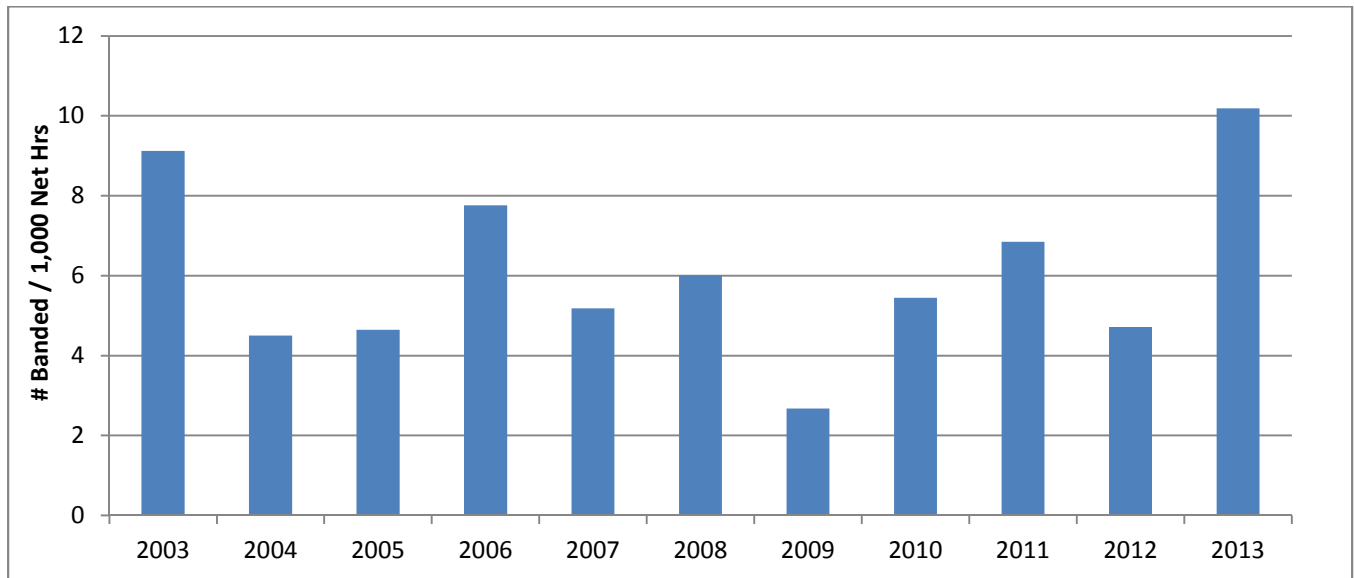


Figure 22. Summary of White-throated Sparrow banded in spring from 2003 to 2013.

Western Tanager

Western Tanager is another species with a restricted Yukon range and which is a likely local breeder at Albert Creek. In the spring of 2013, none were banded; however, this species was observed on 11 days from May 18 to 31 with a high count of 3 birds on May 27. To date, a total of 32 individuals have been banded with 59% in the fall. The earliest and latest records of this species at the observatory are May 16 (2005) and August 31 (2005).

Gray-crowned Rosy-Finch

An uncommon breeding species and passage migrant through the southern Yukon, the second record of Gray-crowned Rosy-Finch at Albert Creek was a bird banded from a seed baited ground trap on April 29, 2013. The same bird was then observed at the site daily until May 2. The first, undated, record was during the spring season site testing during 2002.

Hoary Redpoll

Hoary Redpoll is a rare migrant across southern Yukon and it is observed substantially less frequently than Common Redpoll, which is often banded at Albert Creek during the early part of the spring season. The first record of Hoary Redpoll at Albert Creek was on April 23 when a single bird was banded and photodocumented; two additional birds were banded on May 7 and 9.

3.4 Rusty Blackbirds

As part of an ongoing project in co-operation with Pam Sinclair (CWS-Whitehorse) and the other Yukon Bird Observatories field stations (Teslin Lake, McIntyre Marsh), all Rusty Blackbirds captured are fitted with a color band (light green) in addition to the regular numbered leg band. As each Rusty Blackbird study site uses a different color, the color bands help to identify the origin of a re-sighted individual without the need to recapture it. In 2013, 8 individuals were banded (2 AHY and 6 ASY) bringing the all-time banding total at Albert Creek to 500. When the 2013 banding and observation data are combined, a total of 68 bird days were recorded for Rusty Blackbird and the species was encountered on 18 days from May 7 to 31 with a high count of 22 on May 9.

3.5 Visitors and Volunteers

Once again the observatory hosted numerous visitors and volunteers during 2013. On many days of operation, volunteer personnel were available onsite to provide valuable assistance with the observatory's operation. The observatory hosted two student interns from Evergreen College in Washington, USA (Ayla Mullen and Rhianna Stavish) for the entire spring season. Table 8 and 9 summarize the number of hours spent at the observatory by visitors, volunteers and paid workers. Visitors were defined as those people who visited the observatory (often for a short time) and did not take part in activities at the observatory. Volunteers were those people which took part in the operation of the observatory (often extensively) without being financially compensated. Paid hours were spent by individuals being paid to be at the observatory. This category includes the Banders-In-Charge (Jukka Jantunen and Ted Murphy-Kelly) and individuals paid by other organizations (Yukon Government, Canadian Wildlife Service, etc). Note that the values shown for "paid hours" only include those spent at the observatory and do not include the extensive amount of travel to and from the site, data entry, data analysis, report writing and other communication of the observatory's results. The Watson Lake Visitor's Center and public library played a key role in directing visitors to the observatory, particularly those individuals travelling the Alaska Highway.

Table 8. Summary of paid and volunteer hours at the observatory during 2013.

Season	Paid		Volunteer	
	# of Individuals	Hours	# of Individuals	Hours
Spring	2	260.2	12	643.0

Table 9. Summary of visitor hours and origins at the observatory during 2013.

Season	Locals		Yukon		Canada		USA		Other International		TOTAL	
	#	Hours	#	Hours	#	Hours	#	Hours	#	Hours	#	Hours
Spring	5	2.5	7	11.5	3	3.25	-	-	1	1	18	18.25

The Society of Yukon Bird Observatories (SOYBO) has begun to use social media to promote the field stations (including Albert Creek) by providing regular station updates and photos of birds banded and observed. A Facebook group page (Yukon Bird Observatories) now has 163 members and as of December 2013 the blog page (<http://yukonbirdobservatories.blogspot.com>) has had over 10,000 page views including nearly 1,200 page views from April to June and July to September 2013. In addition, SOYBO's new website (<http://yukonbirdobservatories.org>) came online during the spring of 2013 and ultimately increased the awareness of the observatory's operation and increased visitation rates.

4.0 Conclusion

The results from this season's operation continue to add to the knowledge of numerous aspects of bird biology in the Yukon, including: species distribution, migration timing and local productivity. The study site has proven to be a very effective location for monitoring bird migration. The primary reason for this is the proximity to the extensive Albert Creek Marsh which is a very productive stopover and breeding area for numerous bird species. The geographic location of the observatory also allows a number of species to be monitored which are at the margin of their range and cannot be found elsewhere in the Yukon. Monitoring data collected for species such as Cape May Warbler, White-throated Sparrow and Western Tanager provide information on relative species abundance near the margin of the breeding range.

In 2013, the observatory completed its thirteenth consecutive year of operation; however, the observatory's protocols were not well developed until 2003/2004. The data collected at the observatory to date have indicated a capacity to monitor bird migration during the spring and fall. The primary long term goal of the observatory is to continue migration monitoring and collect data to facilitate the calculation of long term population trends. Although a high diversity of bird species are encountered at the observatory, not all species are suitable candidates for trend analysis. This is due to inadequate sample size of less numerous species or incomplete migration season coverage. As such, the key species for monitoring are those which are relatively common and have the majority of their migration covered by the observatory's monitoring season. Data collected to date suggest that the observatory has a high potential for monitoring a variety of bird species with a primary focus on passerines. Further data collection is required; however, species trend analysis may also be possible for other groups of birds in the future including waterfowl, waterbirds, shorebirds and raptors.

The observatory has been successful in attracting members of the public from Watson Lake and elsewhere to learn about birds and bird migration. Due to the proximity to the Alaska Highway, the observatory has also been successful in attracting tourists to the site.

Appendix A – Albert Creek Bird Observatory Monitoring Protocol

Albert Creek Bird Observatory (ACBO) Field Protocol



Ben Schonewille & Ted Murphy-Kelly
Society of Yukon Bird Observatory
2011 (version 1)

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1.0 Introduction

The Albert Creek Bird Observatory (ACBO) was established in the spring of 2001 by Ted Murphy-Kelly with assistance from a number of agencies including the Southeast Yukon Proper Land Use Society, Canadian Wildlife Service, Yukon Environment and the Yukon Conservation Society. The station is located along the Rancheria Loop Road near Upper Liard, approximately 15 km west of Watson Lake, YT. Over the period of 2001 to 2004, the station operated annually during spring and fall; however, the operations were not standardized. Beginning in 2005, efforts were made to standardize the monitoring efforts at the observatory and this document is intended to serve as a guide in ensure consistent monitoring in the future.

ACBO is an associate member of the nationwide CMMN (Canadian Migration Monitoring Network). Situated in the Liard River valley (60.062° N, 128.916° W) in the southeast Yukon, ACBO offers an ideal location to monitor the migration of birds breeding north of the observatory throughout the Yukon and Alaska. Migration monitoring methods at ACBO follow procedures recommended by the North American Migration Monitoring Council and are similar to methods used elsewhere (Wojnowski et al 2000, Gahbauer and Hudson 2004). This protocol provides a description of field procedures currently in practice at ACBO. It is intended that this protocol should enable personnel, who are unfamiliar with the site, to collect data that are consistent with current procedures.

This document is intended to develop a field protocol for the operation of ACBO with the possibility of revisions to be made should additional components (e.g. owl banding, species specific monitoring using call playback) be added to the protocol in the future.

2.0 Objectives

The primary objectives of Albert Creek Bird Observatory are as follows:

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

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

High priority landbird species for monitoring at Albert Creek are shown in Table 1. Species prioritization follows that of Badzinski and Francis (2000). Species shown in **bold** are those which meet the minimum criteria in Badzinski and Francis (2000) for species trend analysis; at least 10 individuals are observed on a least 5 days per year. Such prioritization currently does not exist for other groups of birds including waterfowl, waterbirds and raptors.

Table 1. Priority landbird species for monitoring at Albert Creek Bird Observatory (not that there are no priority ‘E’ and ‘F’ species which occur regularly at ACBO).

Priority ‘A’	Priority ‘B’	Priority ‘C’	Priority ‘D’
Alder Flycatcher	American Tree Sparrow	American Redstart	American Crow
American Pipit	Boreal Chickadee	Bank Swallow	American Robin
Bay-breasted Warbler	Bohemian Waxwing	Barn Swallow	Black-capped Chickadee
Blackpoll Warbler	Common Redpoll	Black-and-white Warbler	Belted Kingfisher
Cape May Warbler	Dark-eyed Junco	Blue-headed Vireo	Cedar Waxwing
Gray-cheeked Thrush	Fox Sparrow	Chipping Sparrow	Hermit Thrush
Lincoln’s Sparrow	Golden-crowned Sparrow	Cliff Swallow	Northern Flicker
Magnolia Warbler	Lapland Longspur	Common Nighthawk	Pine Siskin
Northern Waterthrush	Myrtle Warbler	Common Yellowthroat	Purple Finch
Orange-crowned Warbler	Northern Shrike	Dusky Flycatcher	Red-breasted Nuthatch
Savannah Sparrow	Pine Grosbeak	Hammond’s Flycatcher	Red-winged Blackbird
Swainson’s Thrush	Ruby-crowned Kinglet	Least Flycatcher	
Tennessee Warbler	Rusty Blackbird	Olive-sided Flycatcher	
Wilson’s Warbler	Swamp Sparrow	Townsend’s Warbler	
Yellow-bellied Flycatcher	Varied Thrush	Tree Swallow	
Yellow-bellied Sapsucker	White-crowned Sparrow	Violet-green Swallow	
	White-throated Sparrow	Western Tanager	
	White-winged Crossbill	Western Wood-Pewee	
		Yellow Warbler	

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

3.0 Migration Monitoring Methods

3.1 Count Area

Albert Creek Bird Observatory is located in the Liard River valley and is located along the eastern margin of the Loon Lake wetland complex. The site is access from the Rancheria Roop Loop Road which joins the Alaska Highway at Upper Liard, approximately 15 km west of the community of Watson Lake (Figure 1). The boundary of the count area is shown by a purple line in Figure 2. The count area is delimited by the following boundaries:

- To the south, the boundary is the crest of the steep hill on the road to the station.
- To the north, the boundary is the cart track which joins the main road approximately 500 m past the banding lab.
- To the east and west, the boundary is approximately 400 m either side of the main road on either side.
- In addition, the count area includes a buffer of 50 m along the cart track to the east of the banding lab to the small clearing at the end of the trail.

Any birds seen or heard by observers, who are within the count area during the count period, may be included in observations contributing to the estimated total, regardless of whether the birds are within the count area. All birds on or over the marsh, whether seen by naked eye or with the assistance of optics, are countable if the observer is within the boundaries of the count area.



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



Figure 2. Map of Albert Creek Bird Observatory count area (marked by purple line).

3.2 Count Period

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

The standard count period timing may be altered by up to 3 hours due to unfavorable weather conditions including rain/snow or cold temperatures. When this occurs, a full scale 6 hour mist netting effort is allowed. In the event that the station is opened later than the scheduled start time and is not attributed to weather, the only effort which is considered standard is that which

extends up to the scheduled count period end. In these instances, a minimum of 3 hours of netting effort is required to be considered standard otherwise the entire effort for the particular day will be considered non-standard.

Some examples of how the standard/non-standard count periods are shown below using an example of May 5th; the predetermined count period for this date is 500 with the net opening and closing being 515 and 1115, respectively.

- At 500, the air temperature is 3°C and the count period starts at 500, nets opened at 515 and closed at 1115, birds are then processed, completed at 1230 and the count period ends at this time.
 - Standard Count Duration = 7.5 hrs
 - Non-Standard Count Duration = 0 hrs
 - Standard Mist Netting Effort = 6.0 hrs
 - Non-Standard Mist Netting Effort = 0 hrs
- At 500, the air temperature is -5°C and the count period start is delayed until 745 when the air temperature rises to 3°C, nets opened at 800 and closed at 1400, birds are then processed, completed at 1500 and the count period ends at this time.
 - Standard Count Duration = 7.0 hrs
 - Non-Standard Count Duration = 0 hrs
 - Standard Mist Netting Effort = 6.0 hrs
 - Non-Standard Mist Netting Effort = 0 hrs
- At 500, the air temperature is 3°C and the count period starts at 500, nets opened at 515 and closed at 1315, birds of the 1115 processed and completed at 1200. Birds captured in the 1315 net closing round completed, bird processing completed at 1400 and the count period ends at this time.
 - Standard Count Duration = 7.0 hrs
 - Non-Standard Count Duration = 2.0 hrs
 - Standard Mist Netting Effort = 6.0 hrs
 - Non-Standard Mist Netting Effort = 2.0 hrs

3.2.1 Spring Count Timing

The core timing of the standardized fall count period will be April 20 to June 7. Should additional resources be available and weather conditions favorable to allow for an extended season, the standardized protocols will be utilized to operate the observatory before and/or after the April 20 to June 7 period.

3.2.2 Fall Count Timing

The core timing of the standardized fall count period will be July 23 to September 23. Should additional resources be available and weather conditions favorable to allow for an extended season, the standardized protocols will be utilized to operate the observatory before and/or after the July 23 to September 23 period.

3.3 Mist Netting

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

The standard mist netting period extends for 6 hours starting at official sunrise (rounded back to the nearest quarter of an hour; see Appendix 1). In addition to mist netting, birds may also be captured using baited ground traps during the spring season. This is done to increase captures of sparrows and blackbirds. Also effort and the resulting birds captured with the ground traps are considered non-standard and must be recorded as such on the data sheets.

3.4 Operating Guidelines

3.4.1. Mist Net Array

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

The standard mist net array for the spring and fall seasons is shown in Figure 3. Mist net specifications are detailed in Table 2. In addition to these nets, non-standard nets are allowed must be indicated as such on all effort and species estimated total sheets. For example, nets may be useful to target specific species (such as Rusty Blackbird) or to test innovative capture techniques such as canopy nets.

Table 2. ACBO mist net specifications.

Net #	Length	Height	# of Panels	CF
1	12 m	2.75 m	4	1
2	12 m	2.75 m	4	1
3	12 m	2.75 m	4	1
4	12 m	2.75 m	4	1
5	12 m	2.75 m	4	1
21	12 m	2.75 m	4	1
22	18 m	2.75 m	4	1.5
24	12 m	2.75 m	4	1
25	12 m	2.75 m	4	1
26	18 m	2.75 m	4	1.5
6	12 m	2.75 m	4	1
7	12 m	2.75 m	4	1
8	12 m	2.75 m	4	1
9	12 m	2.75 m	4	1
23	12 m	2.75 m	4	1
10	12 m	2.75 m	4	1
11	12 m	2.75 m	4	1
12	12 m	2.75 m	4	1
13	12 m	2.75 m	4	1
14	12 m	2.75 m	4	1
27	12 m	2.75 m	4	1
15	12 m	2.75 m	4	1
16	12 m	2.75 m	4	1
17	12 m	2.75 m	4	1
18	18 m	2.75 m	4	1.5
19	12 m	2.75 m	4	1
20	12 m	2.75 m	4	1

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

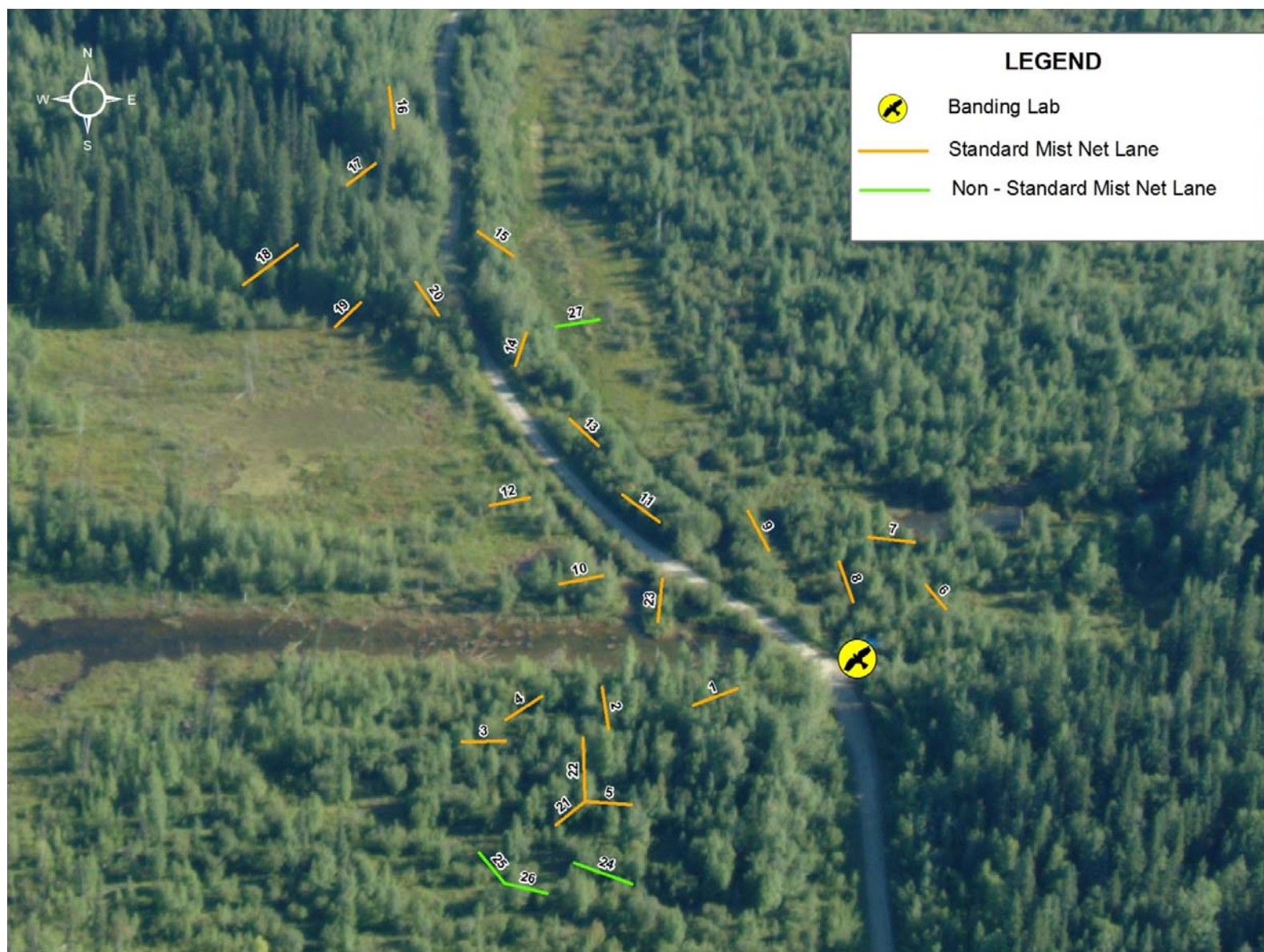


Figure 3. ACBO mist net array.

A total of 23 standard mist nets may be used on a daily basis (see Table 2). The opening and closing of nets shall be conducted in the same order each day and should progress in the following order:

- The net loop which ends at nets 3 and 4,
- The net loop which includes nets 6, 7 and 8
- The nets along the road from net 9 and 23 to net 16, then along the trail towards nets 18 and 19 and finishing at 20.

The number of nets used on a daily basis shall be determined by a number of factors including; number of qualified personnel onsite, bird activity and weather. The core group of 13 nets which shall be used on a daily basis as conditions allow include the following; 1, 2, 3, 4, 6, 7, 8, 9, 23, 10, 11, 12 and 13. Additional mist nets should be opened when conditions allow and should be done so at the discretion of the BIC. In the advent of unfavorable weather or a backlog of birds, all mist nets should be closed until the backlog of birds is processed or the weather improves. Should birds be released unbanded due to an excessive backlog of birds or other reason, the number of individuals should be recorded as “obs” on the daily log sheet. In the event that this occurs, a comment should also be made in the daily narrative as to the number and species released unbanded.

Only the standard nets should be operated during the standard period. Exceptions may be made in order to catch and document a rare bird or where the trapping involves non-target species (e.g. shorebirds, waterfowl) and does not affect the standard program. Birds caught during the standard period in non-standardized nets or traps (e.g. shorebird trap, by hand, etc.) must be denoted as NSB (non-standard banding) in the comments column on the banding sheets. These birds should also be included in the NSB – Band column of the log sheets.

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

The use of bird seed within the count area is allowed only in the baited ground traps (spring only). Other means of attracting birds to the count area are not permitted with the following exceptions:

- Nocturnal audio-luring of owls is permitted during testing of the site for monitoring owls.

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

3.4.2 Banding

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

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

Should any birds show signs of excessive stress upon extraction, they should be released immediately at the net and recorded within the “Obs” column of the daily log sheet. In the event that this occurs, a comment should also be made in the daily narrative as to the number and species released unbanded.

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

3.4.3 Visual Migration Counts

Currently, there is no protocol in place to conduct visual migration counts at ACBO; however, such counts may be conducted when conditions allow. In the event that watches are conducted, the duration of the counts and the primary observed shall be recorded. In the event that counts of an extended duration are conducted, the effort and birds observed should be split into one hour segments beginning/ending at the top of the hours. Any birds seen on visual counts shall be recorded in the standard of non-standard “VIS” column on the log sheets.

Any incidental visual migrants observed (such as swans, geese or cranes) shall be recorded in the standard of non-standard “Oth VIS” column on the log sheet. All visual migrants recorded shall be collected independently of other survey / banding activities at the station. In other words, all birds classified as “VIS” or “Oth VIS” cannot be recorded in other Estimated Totals categories.

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

- Any birds flying over the site without stopping shall be considered migrants (this is typically in a northward direction in spring and southward direction in fall but may also be in other directions).

- In the case of small passerines, individuals seen moving through the vegetation at a fairly steady pace without prolonged periods of stopover shall be considered migrants.
- Birds (typically small passerines such as warblers) observed landing at the site, and leaving shortly after shall be considered migrants despite stopping briefly.
- Any birds observed “dropping in” to the site and not leaving shortly after shall not be considered migrants.

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

3.4.4 Census Legs

To increase the collection of bird observations within the count area, a series of census legs are surveyed within the count area. Each leg is intended to take 10 to 15 minutes and are to be completed whenever adequate personnel are present onsite (as allowed by bird activity). All birds counted on the census routes shall be recorded on the census field data sheet and summarized into the “Census” column of the ET sheets. Descriptions of each census leg is described below:

- Leg #1
 - Starts at net 23 and follows the road to net 20, then follows the trail by nets 19, 17, 16, and finally the road back to net 15. At the start point, on your left, try to concentrate on the birds north of the main slough and, on your right, the nearby ones that are between the road and the slough on that side. Later count everything but try not to double-count near nets 20 and 15.
- Leg #2
 - Starts at the banding table, follows the net 6, 7, 8 loop where try count the birds north of the spruce forest trail and on net 8 side of the slough. Along the trail to the gauntlet try to only count birds on that side of the main slough. It then goes to the south (left) end of 25/26. From there follow green flagging west to the marsh edge. Finish at double (or triple) flagging. This leg is little wet near the end so rubber boots are recommended.
- Leg #3
 - Starts at the green flagging (on the right side of road as seen from the banding table) about 50 meters from the banding table. This leg follows the road to the top of the hill

and is meant to be walked both ways (there and back) in that 15 minutes. The turn around point is at double green flagging (on the right side).

- Leg #4
 - Also intended to be walked both ways and it follows the spruce forest trail. The start point is where the first big spruce trees are on the left side (not flagged) and the turn around point is at the two flags, one on each side of the trail.
- Leg #5
 - Starts at net 16 turn-off and goes north to the green flagging at the road split, and then comes back.

3.4.5 Other Observations

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

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

3.5 Estimated Totals (ETs)

The Estimated Total (ET) is the best estimate of the number of individuals of each species detected in the count area during the standard count period. To arrive at the ETs, all personnel involved in the respective day’s activities shall be involved to help reduce the possibility of double counting individual birds.

3.6 Overall Coverage Codes

Each day, an overall coverage code, ranging from 0 to 5, is assigned based on the actual effort during the count period (6.5 hours after sunrise) that day. The coverage code takes into

consideration the number of observers and their skill levels (Table 3), as well as the overall counting and mist netting effort. The coverage codes and the criteria used to assign them, are described in Table 4. For the code to be assigned, **all the listed criteria must be met**. The aim should be to achieve Code 3 coverage as frequently as possible.

Table 3. Observer skill levels.

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

Table 4. Criteria for assigning daily coverage codes.

Code	Coverage	Criteria
0	No coverage	
1	Casual	Casual observations and/or banding. Very limited or no visible migration count
2	Poor	At least 1 Class 1 or 2 observer active throughout count period; no or limited mist netting effort.
3	Fair	At least 1 Class 1 or 2 observer active throughout count period; mist netting may have been restricted by weather (maximum 100 corrected net hrs).
4	Good	At least 1 Class 1 or 2 observer active throughout count period; at least 100 corrected net hrs unless reduced due to backlog of birds.
5	Excellent	At least 1 Class 1 and 1 Class 2 observers active throughout count period; over 100 corrected net hrs unless reduced due to backlog of birds.

3.7 Additional Observations

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

3.8 Data Entry

The ACBO standard is to that all data (including effort, banding and ET data) will be entered into a Microsoft Excel / Access database. All applicable banding data will be provided to Environment Canada's Bird Banding Office on a yearly basis in a timely manner. Aside from data submission to Environment Canada to fulfill permit obligations, all relevant data will be provided to the Canadian Wildlife Service (Whitehorse) and the Yukon Bird Club for inclusion in seasonal bird sighting summaries, etc.

3.9 Personnel

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

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

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

6.0 Vegetation Management

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7.0 Literature Cited

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Appendix 1
SPRING AND FALL DAILY COUNT TIMING

Date	Sunrise	Count Period Start Time	Mist Net Open	Mist Net Close	Count Period End (Approximate)
18-Apr	609	545	600	1200	1330
19-Apr	606	545	600	1200	1330
20-Apr	603	545	600	1200	1330
21-Apr	600	545	600	1200	1330
22-Apr	558	530	545	1145	1345
23-Apr	555	530	545	1145	1345
24-Apr	552	530	545	1145	1345
25-Apr	549	530	545	1145	1345
26-Apr	546	530	545	1145	1345
27-Apr	543	515	530	1130	1330
28-Apr	540	515	530	1130	1330
29-Apr	537	515	530	1130	1330
30-Apr	535	515	530	1130	1330
01-May	532	515	530	1130	1330
02-May	530	515	530	1130	1330
03-May	526	500	515	1115	1315
04-May	524	500	515	1115	1315
05-May	521	500	515	1115	1315
06-May	519	500	515	1115	1315
07-May	516	500	515	1115	1315
08-May	514	445	500	1100	1300
09-May	512	445	500	1100	1300
10-May	510	445	500	1100	1300
11-May	507	445	500	1100	1300
12-May	504	445	500	1100	1300
13-May	501	445	500	1100	1300
14-May	459	430	445	1045	1245
15-May	457	430	445	1045	1245
16-May	455	430	445	1045	1245
17-May	452	430	445	1045	1245
18-May	449	430	445	1045	1245
19-May	447	430	445	1045	1245
20-May	445	430	445	1045	1245
21-May	443	415	430	1030	1230
22-May	441	415	430	1030	1230
23-May	439	415	430	1030	1230
24-May	437	415	430	1030	1230
25-May	435	415	430	1030	1230
26-May	433	415	430	1030	1230
27-May	431	415	430	1030	1230
28-May	429	400	415	1015	1215
29-May	427	400	415	1015	1215
30-May	425	400	415	1015	1215
31-May	424	400	415	1015	1215
01-Jun	423	400	415	1015	1215
02-Jun	421	400	415	1015	1215

Date	Sunrise	Count Period Start Time	Mist Net Open	Mist Net Close	Count Period End (Approximate)
03-Jun	420	400	415	1015	1215
04-Jun	419	400	415	1015	1215
05-Jun	417	400	415	1015	1215
06-Jun	416	400	415	1015	1215
07-Jun	415	400	415	1015	1215
08-Jun	414	345	400	1000	1200
09-Jun	413	345	400	1000	1200
10-Jun	412	345	400	1000	1200

Date	Sunrise	Count Period Start Time	Mist Net Open	Mist Net Close	Count Period End (Approximate)
23-Jul	454	430	445	1045	1215
24-Jul	456	430	445	1045	1215
25-Jul	459	430	445	1045	1215
26-Jul	501	445	500	1100	1230
27-Jul	503	445	500	1100	1230
28-Jul	505	445	500	1100	1230
29-Jul	508	445	500	1100	1230
30-Jul	510	445	500	1100	1230
31-Jul	512	445	500	1100	1230
01-Aug	515	500	515	1115	1245
02-Aug	517	500	515	1115	1245
03-Aug	519	500	515	1115	1245
04-Aug	522	500	515	1115	1245
05-Aug	524	500	515	1115	1245
06-Aug	527	500	515	1115	1245
07-Aug	529	500	515	1115	1245
08-Aug	532	515	530	1130	1300
09-Aug	534	515	530	1130	1300
10-Aug	536	515	530	1130	1300
11-Aug	539	515	530	1130	1300
12-Aug	541	515	530	1130	1300
13-Aug	544	515	530	1130	1300
14-Aug	546	530	545	1145	1315
15-Aug	549	530	545	1145	1315
16-Aug	551	530	545	1145	1315
17-Aug	553	530	545	1145	1315
18-Aug	556	530	545	1145	1315
19-Aug	558	530	545	1145	1315
20-Aug	601	545	600	1200	1330
21-Aug	603	545	600	1200	1330
22-Aug	605	545	600	1200	1330
23-Aug	608	545	600	1200	1330
24-Aug	610	545	600	1200	1330
25-Aug	613	545	600	1200	1330
26-Aug	615	600	615	1215	1345
27-Aug	617	600	615	1215	1345
28-Aug	620	600	615	1215	1345
29-Aug	622	600	615	1215	1345
30-Aug	625	600	615	1215	1345
31-Aug	627	600	615	1215	1345
01-Sep	629	600	615	1215	1345
02-Sep	632	615	630	1230	1400
03-Sep	634	615	630	1230	1400
04-Sep	636	615	630	1230	1400
05-Sep	639	615	630	1230	1400
06-Sep	641	615	630	1230	1400

Date	Sunrise	Count Period Start Time	Mist Net Open	Mist Net Close	Count Period End (Approximate)
07-Sep	644	615	630	1230	1400
08-Sep	646	630	645	1245	1415
09-Sep	648	630	645	1245	1415
10-Sep	651	630	645	1245	1415
11-Sep	653	630	645	1245	1415
12-Sep	655	630	645	1245	1415
13-Sep	658	630	645	1245	1415
14-Sep	700	645	700	1300	1430
15-Sep	702	645	700	1300	1430
16-Sep	705	645	700	1300	1430
17-Sep	707	645	700	1300	1430
18-Sep	710	645	700	1300	1430
19-Sep	712	645	700	1300	1430
20-Sep	714	645	700	1300	1430
21-Sep	717	700	715	1315	1445
22-Sep	719	700	715	1315	1445
23-Sep	721	700	715	1315	1445

Appendix 2
FIELD MANUAL

Albert Creek Bird Observatory
Field Manual

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#

1.0 Introduction

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

2.0 Data Collection

2.1 Daily Log Sheet

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

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

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

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

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

Visibility – shall be recorded using the following relative measures:

- Excellent
- Good
- Poor
- Very Poor

Cloud Cover – approximation to the nearest 10%

Temperature – measured to the nearest degree

Precipitation – shall be recorded using the following codes

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

The daily narrative should be filled out at the end of each day's activities and may include a synopsis of the day's activities including a brief synopsis of bird migration. Also to be included are any interesting notes regarding visitors or station maintenance activities.

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

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

2.2 Banding Sheet

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

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

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

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

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

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

0 = Unknown

1 = AHY

2 = HY

4 = L

5 = SY

6 = ASY

7 = TY

8 = ATY

0 = Unknown

4 = Male

5 = Female

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

1 = Plumage

2 = Skull

3 = Eye Color

4 = Wing Length

5 = Cloacal Protuberance

6 = Brood Patch

7 = Mouth/bill

8 = Culmen Length

9 = Retrice Shape

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

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

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

0 = None

1 = Trace

2 = Light

3 = Half

4 = Filled

5 = Bulging

6 = Greatly Bulging

7 = Excessively Bulging

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

0 = None (cloaca not enlarged)

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

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

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

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

0 = None (no brood patch)

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

2.3 Recapture Sheet

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

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

2.4 Molt Sheet

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

Appendix 3
BANDING SHEETS

Location _____

RECAPTURES

Page # of Recaptures

ALBERT CREEK BIRD OBSERVATORY - Recapture Sheet

Permit # 10699

Banders _____

Initials _____

Year _____

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

Species _____

Appendix 4
DAILY LOG SHEETS

ALBERT CREEK BIRD OBSERVATORY

Daily Log Sheet

DATE	
------	--

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

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

Visitors	Origin	Time	Total Hours

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

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

Total Birds Banded	
Total Species Banded	
Total Birds Recaptured	

Total Species Detected	
SEASON BANDED TOTAL	

Rare Bird Bandings / Sightings	Bird Mortalities / Injuries

Daily Narrative (description of migration activity, visitors, station maintenance, etc)

Mist Net & Ground Trap Effort

DATE	
------	--

Net #	Net Length (m)	Standard Count Period									Non Standard Corrected Net Hrs
		Open	Close	Open	Close	Open	Close	Total Hrs	Correction Factor	Corrected Net Hrs	
1	12								1		
2	12								1		
3	12								1		
4	12								1		
5	12								1		
21	12								1		
22	18								1.5		
6	12								1		
7	12								1		
8	12								1		
9	12								1		
23	12								1		
10	12								1		
11	12								1		
12	12								1		
13	12								1		
14	12								1		
15	12								1		
16	12								1		
17	12								1		
18	18								1.5		
19	12								1		
20	12								1		
24	18								1.5		
25	12								1		
26	12								1		
27	12								1		
TOTAL											

GROUND TRAP EFFORT				** Remember to separate GT captures in ET sheets **
# OF TRAPS	OPEN	CLOSE	TOTAL TRAP HRS	

Census Field Data Sheet

DATE	
------	--

Census Leg #							
	1	2	3	4	5	Total	Est Individuals
Start Time							
Observer							
<i>Species</i>							
TOTAL BIRDS							
TOTAL SPECIES							

Appendix B – Species Checklist and All Time Banding Totals

Table 1. Summary of birds banded and observed (✓) to date at the Albert Creek Bird Observatory. Note that observations from 2011 to 2003 are excluded from this table.

Species	2001		2002		2003		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		TOTAL BANDED				
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	ALL		
Red-throated Loon							✓		✓	✓		✓		✓					✓	✓	✓										
Common Loon							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
Red-necked Grebe							✓	✓			✓									✓	✓		✓	✓							
Horned Grebe									✓		✓		✓							✓	✓			✓							
Greater White-fronted Goose							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
Snow Goose							✓				✓	✓							✓						✓						
Canada Goose							✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
Trumpeter Swan							✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
Tundra Swan									✓		✓		✓		✓		✓		✓		✓		✓		✓						
Gadwall											✓				✓		✓														
American Wigeon							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
Mallard							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
Blue-winged Teal							✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓			✓	2	✓			2	2		
Cinnamon Teal																			✓												
Northern Shoveler							✓	✓	✓		✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓							
Northern Pintail							✓	✓	✓	✓	✓		✓	✓	✓		✓		✓		✓	✓	✓	✓							
American Green-winged Teal							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1	✓	1	✓	✓	✓			2	2		
Canvasback															✓		✓		✓		✓				✓						
Ring-necked Duck							✓		✓	✓	✓		✓	✓	✓		✓	✓	✓	✓	✓		✓								
Greater Scaup															✓																
Lesser Scaup							✓		✓		✓		✓		✓		✓						✓								
Long-tailed Duck									✓		✓																				
Bufflehead							✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	2	✓	✓	✓		✓		2		2		
Common Goldeneye							✓		✓		✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓						
Barrow's Goldeneye							✓		✓		✓		✓	✓			✓			✓		✓	✓	✓							
Common Merganser							✓		✓		✓	✓	✓		✓		✓		✓		✓		✓								
Red-breasted Merganser									✓						✓																
Hooded Merganser											✓										✓										
Bald Eagle							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
Northern Harrier							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1					
Sharp Shinned hawk				1	3	1	✓	✓	1	2	2	✓	1	4	✓	1	✓	4	✓	2	✓	7	1	2	2		8	24	32		
Northern Goshawk							✓	✓	✓		✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓							
Swainson's Hawk														✓						✓											
Red-tailed Hawk							✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓							
Rough-legged Hawk											✓	✓			✓					✓											
Golden Eagle															✓						✓										
American Kestrel							✓	✓	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	1		1		
Merlin							✓	✓						✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓					
Peregrine Falcon																							✓								
Osprey							✓		✓	✓	✓		✓	✓			✓	✓	✓	✓	✓	✓	✓	✓							
Ruffed Grouse							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
Spruce Grouse							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓						
Sora										✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1	✓	✓	1		1		
American Coot									✓											✓											
Sandhill Crane							✓	✓		✓	✓	✓	✓	✓	✓		✓		✓	✓	✓	✓			✓						
American Golden-Plover														✓	✓											✓					
Semi-palmated Plover									✓		✓		✓		✓		✓								✓						
Killdeer							✓			✓		✓	✓	✓	✓		✓		✓		✓		✓								
Greater Yellowlegs							✓		✓		✓	✓	✓		✓		✓		✓	✓	✓	✓	✓	✓							
Wandering Tattler											✓		✓																		
Lesser Yellowlegs							✓	✓	✓	✓			✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓		✓					
Solitary Sandpiper					1		✓	✓	3	✓	12	✓	9	2	1	✓	2	✓	2	✓	1	2	6		2	37	4	41			
Spotted Sandpiper								✓	✓		✓	✓	1	1		✓	✓	✓	✓	✓	✓	1	2		✓	3	2	5			

Species	2001		2002		2003		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		TOTAL BANDED		
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	ALL
Upland Sandpiper																	✓												
Semi-palmated Sandpiper													✓	✓						✓		✓							
Least Sandpiper											✓		✓		✓	✓	✓		✓	✓		2	✓	✓	✓			2	2
Baird's Sandpiper																									✓				
Pectoral Sandpiper										✓		✓	✓	✓	✓		✓		✓	✓		✓	✓		✓				
Short-billed Dowitcher													✓		✓														
Long-billed Dowitcher										✓		✓		✓	✓	✓		✓	✓	✓		✓			✓				
Whimbrel													✓		✓												✓		
Wilson's Snipe					1		✓	✓	✓	✓	✓	1	1	1	✓	✓	1	✓	✓	✓	✓	✓	1	2	✓		4	4	8
Red-necked Phalarope																							✓						
Mew Gull							✓		✓		✓		✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		✓				
Herring Gull							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓				
Bonaparte's Gull							✓		✓		✓		✓		✓						✓		✓		✓				
Arctic Tern																				✓						✓			
Eurasian Collared Dove																										✓			
Great Horned Owl														✓						✓	✓	✓	✓						
Northern Hawk Owl										✓			✓	✓								✓							
Barred Owl																				✓	✓			✓	✓	✓			
Short-eared Owl							✓																						
Boreal Owl													✓	2	1	✓				✓	2		✓				1	4	5
Northern Saw-whet Owl															✓														
Common Nighthawk									✓		✓			✓			✓	✓		✓	✓								
Belted Kingfisher							✓	✓		✓	1	✓	1	2	✓	✓	✓	✓	✓	✓	1	4	1	1	1	1	4	7	11
Yellow-bellied Sapsucker	1	1	2	1	7	8	15	21	9	14	17	18	16	16	9	10	9	5	7	16	11	9	14	4	5	117	123	240	
Downy Woodpecker							✓					1							✓	✓		1					2	2	
Hairy Woodpecker					1		1	✓	1	✓	✓	✓	✓	✓	✓	✓	1	✓	✓	✓	✓	✓	✓	✓	2	4		4	
Three-toed Woodpecker						2		1		✓	✓	✓	1	✓	✓	✓	✓	✓	✓	1	✓	✓	✓	✓	1	1	4	5	
Black-backed Woodpecker								1		✓				✓	✓	✓				✓							1	1	
Yellow-shafted Northern Flicker			1				2	1	1	2	✓	1	1	1	3	1	✓	✓	✓	✓	✓	✓	1	✓	1	9	6	15	
Pileated Woodpecker							✓	✓	1	2	✓	✓	✓	✓	✓	✓					✓	✓	✓	✓	✓	1	2	3	
Olive-sided Flycatcher							2			✓	5	✓	1	✓	2	✓	✓	✓	2	1	✓		4		✓	16	1	17	
Western Wood-pewee					1		✓				4		✓		2	✓	✓		2	✓	1	1	✓	1	✓	10	2	12	
Yellow-bellied Flycatcher			1	4			2	1	1	2			1	2		2	✓	6	✓	1	✓	6	1	1		6	25	31	
Alder Flycatcher	5	5	19	27	16	80	19	217	23	174	80	183	28	253	21	202	35	93	7	78	14	122	79	36	5	346	1470	1816	
Least Flycatcher	1	3	5	9	3	8	✓	19	2	16	3	12	4	14	2	11	1	7	✓	15	3	44	3	9	5	27	167	194	
Hammond's Flycatcher							2	1	2	12	14	14	8	9		2	7	2	4	1	16	6	20	12	8	5	59	81	140
Dusky Flycatcher										1				1	1			2				1				1	2	4	6
Say's Phoebe							✓				1		✓		✓		✓					1	✓	4		1	6		6
Horned Lark														✓		✓													
Northern Shrike				1				✓				4	✓		1	1			1		✓	✓	✓			✓	1	7	8
Blue-headed Vireo						2		6		4	✓	2		1								1	✓			✓		16	16
Warbling Vireo	2	3	8	19	6	17	11	28	10	34	7	22	7	26	3	17	5	14	4	27	5	64	1	8	5	69	279	348	
Philadelphia Vireo								1								✓											1	1	1
Red-eyed Vireo							1						✓														1	1	1
Gray Jay	1		4		4		1	1	1	2	✓	2	1	1	✓	✓	✓	✓	4	1	✓	1	3	2	3	19	10	29	
American Crow											✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Common Raven							✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			
Tree Swallow							✓	✓		✓	✓	✓	1	✓	13		✓	✓	4	✓	3	✓	7	✓	7	28		28	
Violet-green Swallow							✓	✓			✓		✓		2		✓		1	✓	1	✓	✓		✓	4		4	
Northern Rough-winged Swallow															✓														
Bank Swallow													✓		✓		✓		✓	✓	✓	✓	✓		✓				
Cliff Swallow								✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
Barn Swallow							✓	✓			✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓				
Black-capped Chickadee		4	4	5		3	5	12	2	13	✓	16	✓	10	✓	16	✓	8	2	6	✓	11	✓	9	✓	13	113	126	

Species	2001		2002		2003		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013		TOTAL BANDED		
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	ALL
Boreal Chickadee		8	5	7	6	7	1	6	1	8	3	8	✓	13	3	6	✓	27	5	14	8	48	5	2	2		37	154	191
Red-breasted Nuthatch		3			1		✓	1		✓	✓	✓	✓	1	✓	✓		✓	✓	1	✓	2	✓	2	✓	1	10	11	
Winter Wren											✓																		
Golden-crowned Kinglet										3				3		✓					✓	3					9	9	
Ruby-crowned Kinglet	17		20	29	24	125	51	47	18	200	246	412	75	184	88	53	✓	121	42	93	40	55	94	51	72	715	1370	2085	
Townsend's Solitaire													✓																
Mountain Bluebird																									✓				
Gray-cheeked Thrush			9	4	1	1	18	10	2	8	22	17	13	8	2	5	2	10	6	5		2	16	2	17	91	72	163	
Swainson's Thrush	2	1	25	7	21	65	53	104	19	133	46	93	55	137	15	70	19	43	29	66	35	74	82	31	43	401	824	1225	
Hermit Thrush		1	2	3	2	3	3	7	4	2	6	6	1	3	5	2	2	10	2	10	9	1	16		1	52	48	100	
American Robin	3		6		10	3	13	6	19	1	31	2	18	2	5	1	9	✓	17	11	19	5	21	4	15	171	35	206	
Varied Thrush				2	1	3	✓	3	2	2	3	7	✓	3	✓	5	✓	5	1	7	5	10	10	1	4	22	48	70	
American Pipit			1				✓	2		✓	5	✓	1	✓	✓	✓	✓	✓	1	✓	✓	3	✓	1	✓	✓	11	3	14
Bohemian Waxwing					2		✓		6	✓	9	✓	✓	✓	2		2	✓	✓	✓	1	✓	1		✓	23		23	
Cedar Waxwing								8						8	✓	3		1		4	1	✓		✓		1	24	25	
Lapland Longspur							2	✓		✓	35	✓	1	✓	2	✓	6	✓	1	✓	3		1	✓	✓	51		51	
Snow Bunting													✓																
Tennessee Warbler	1	4	12	9	17	14	48	12	51	30	60	15	21	22	22	28	8	137	26	158	23	152	78	5	19	367	586	953	
Orange-crowned Warbler	57	12		30	137	52	286	199	105	122	214	151	251	152	339	87	170	97	177	61	75	88	288	36	78	2099	1087	3186	
Yellow Warbler	6	7	84	22	65	50	61	159	33	149	313	125	261	214	208	93	96	157	65	85	334	82	485	29	23	2011	1172	3183	
Magnolia Warbler	1	1	2	22	1	36	4	26	4	19	1	32	5	38	4	38	✓	27	✓	20	✓	24	2	8		24	291	315	
Cape May Warbler							✓			2	✓		2	3	3	2	1		✓	1	✓	1	✓		1	6	9	15	
Yellow-rumped Myrtle Warbler	73	35	9	80	143	86	268	138	91	185	364	105	113	262	434	117	505	90	776	83	217	287	571	89	61	3564	1557	5121	
Yellow-rumped Warbler											3				✓	1											3	1	4
Townsend's Warbler		1				3	1			3		1	✓	1	4		✓	2	✓		✓	1	✓		✓	5	12	17	
Bay-breasted Warbler							1	1				1	✓		✓					1							1	3	4
Blackpoll Warbler	3	8	8	8	22	13	22	44	17	30	62	32	57	41	88	19	65	36	62	16	121	28	107	23	5	634	298	932	
Black-and-white Warbler					1					1	1		1				1						1		✓	5	1	6	
MacGillivray's Warbler							1															1				1	1	2	
American Redstart		1	9	19	7	27	18	35	9	54	15	48	10	50	6	90	2	38	7	54	3	52	15	17	1	101	485	586	
Ovenbird					1							1					✓						1		1	2	1	3	
Northern Waterthrush	11	3	51	22	47	33	69	95	50	157	91	97	145	248	31	195	113	202	65	248	81	191	166	93	106	920	1584	2504	
Common Yellowthroat	3	6	38	40	35	72	17	107	19	199	62	228	85	217	46	191	35	233	57	205	102	185	86	68	40	585	1751	2336	
Wilson's Warbler	16	10	189	28	384	83	502	203	552	106	398	218	369	167	182	146	274	158	249	90	125	68	259	42	228	3499	1319	4818	
American-tree Sparrow	6	1	9	19	24	26	172	66	175	150	196	223	345	116	74	61	28	117	136	31	63	19	571	2	61	1799	831	2630	
Chipping Sparrow			7	1	10	1	4	9	12	2	8	1	8	3	6	1	2	4	9	2	6	2	2		4	74	26	100	
Clay-colored Sparrow																			1							1		1	
Savannah Sparrow	4		7	3	27	6	38	19	31	7	42	13	70	18	53	7	37	28	49	6	85	3	41	2	63	484	112	596	
Fox Sparrow	4		1	4	11	14	28	15	143	25	28	53	60	9	51	22	11	54	257	49	164	14	181	19	155	939	278	1217	
Song Sparrow										1																	1	1	
Lincoln's Sparrow	16	14	30	29	39	42	42	91	51	108	23	124	120	74	27	57	32	99	60	89	66	80	193	34	101	699	841	1540	
Swamp Sparrow		4		6	4	9	2	7	1	33	4	40	5	21	5	29	17	17	6	20	7	16	6	2	3	40	204	244	
White-throated Sparrow	2	4	19	6	20	33	9	30	14	27	18	22	14	9	14	10	7	22	12	26	17	23	10	7	22	156	219	375	
White-crowned Sparrow	6	1	7	3	6	9	184	11	269	13	14	22	217	10	138	5	64	26	262	15	68	16	263	4	394	1498	135	1633	
Golden-crowned Sparrow					2		6	1	4		2		14	1	3		3		1		3	1	6		15	44	3	47	
Vesper Sparrow															1												1		1
Dark-eyed "Slate-colored" Junco	3	4	15	65	20	39	194	44	42	585	70	179	334	81	48	39	15	96	57	50	109	91	263	6	102	1170	1279	2449	
Dark-eyed "Oregon" Junco													1														1		1
Dark-eyed Junco													4				1		2	3	2		2			11	3	14	
Western Tanager			1			1	2	2	1	3	1	1	1	2		2	3		1	2	1	7	1		✓	12	20	32	
Rose-breasted Grosbeak							✓						✓						✓				✓						
Red-winged Blackbird							✓	✓	7	✓	8	✓	4	✓	2	✓	2	✓	1	✓	8	✓	1	✓	✓	33		33	
Yellow-headed Blackbird																					✓								
Rusty Blackbird	2	2		1	5	10	5	12	37	15	81	35	14	31	47	9	1	10	3	26	57	4	80	5	8	332	160	492	

Species	2001		2002		2003		2004		2005		2006		2007		2008		2009		2010		2011		2012		2013	TOTAL BANDED		
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Spring	Fall	ALL
Brown-headed Cowbird						1	✓			✓	✓		4		1				2		✓	✓	3		1	10	1	11
Gray-crowned Rosy Finch																									1	1	0	1
Pine Grosbeak											2				✓		✓				✓	✓			✓		2	2
Purple Finch	5		9		11		10	3	8	11	8		5	1	9		4		14	✓	8	✓	3		✓	94	15	109
Red Crossbill										✓			✓		✓	✓	✓		✓	✓	✓	✓	✓					
White-winged Crossbill							✓	✓		7	16	✓	✓	12	✓	✓	✓	1	✓	10	✓	2	✓	✓		16	32	48
Common Redpoll							68		2		46	1	12		54	14	✓	✓	127	✓	1	1	58		294	368	16	384
HoaryRedpoll																									3			
Pine Siskin			6	4	2	31	2	5		✓		✓	✓	✓	2	✓	✓	✓	✓	41	✓	28	2	34	20	14	143	157
TOTAL BIRDS BANDED	251	147	625	540	1152	1021	2265	1839	1867	2681	2701	2585	2799	2502	2087	1676	1576	2013	2623	1770	1920	1964	4133	703		23999	19441	43440
TOTAL SPECIES BANDED	26	27	35	35	44	40	46	48	47	48	49	45	53	52	51	42	39	40	46	48	48	54	57	40		80	76	90
TOTAL SPECIES OBSERVED	-	-	-	-	-	-	103	87	85	87	111	87	125	104	120	88	107	86	112	106	118	107	116	70		-	-	162

Appendix C – Daily Species Total Summary

Species	# of Days	Bird Days	First Date	Last Date	High Count (#)	High Count (Date)
Common Loon	19	23	9-May	29-May	4	18-May
Horned Grebe	3	4	16-May	20-May	2	17-May
Red-necked Grebe	3	3	17-May	19-May	1	all days
Greater White-fronted Goose	10	1419	29-Apr	19-May	675	9-May
Snow Goose	2	14	3-May	6-May	13	6-May
Canada Goose	33	521	27-Apr	31-May	128	1-May
Trumpeter Swan	22	54	29-Apr	31-May	10	9-May
Tundra Swan	11	5230	29-Apr	9-May	2635	2-May
American Wigeon	10	104	7-May	21-May	50	7-May
Mallard	28	156	1-May	31-May	22	12-May
Blue-winged Teal	16	52	16-May	31-May	6	26/30 May
Northern Shoveler	10	36	13-May	31-May	11	19-May
Northern Pintail	5	157	6-May	25-May	150	6-May
American Green-winged Teal	15	29	12-May	29-May	4	16-May
<i>Unidentified Dabbling Duck</i>	1	130	6-May	-	130	6-May
Canvasback	1	18	17-May	-	18	17-May
Ring-necked Duck	12	33	13-May	31-May	4	many days
Lesser Scaup	4	15	16-May	20-May	8	16-May
Bufflehead	16	30	11-May	31-May	4	16-May
Common Goldeneye	20	77	5-May	31-May	14	11-May
Barrow's Goldeneye	12	37	13-May	25-May	9	13-May
<i>Unidentified Goldeneye</i>	3	11	14-May	27-May	7	14-May
Common Merganser	3	5	1-May	20-May	2	1/20 May
<i>Unidentified Diving Duck</i>	1	45	17-May	-	45	17-May
<i>Unidentified Duck</i>	5	161	30-Apr	25-May	102	18-May
Bald Eagle	11	15	29-Apr	17-May	2	many days
Northern Harrier	12	29	1-May	20-May	8	8-May
Sharp-shinned Hawk	8	11	27-Apr	30-May	2	many days
Red-tailed Hawk	6	11	27-Apr	9-May	4	8-May
Rough-legged Hawk	4	6	27-Apr	9-May	3	30-Apr
<i>Unidentified Buteo</i>	4	4	30-Apr	8-May	1	all days
American Kestrel	10	11	2-May	25-May	2	18-May
Merlin	3	3	30-Apr	7-May	1	all days
Osprey	2	2	8-May	24-May	1	both days
Ruffed Grouse	15	27	24-Apr	29-May	3	many days
Spruce Grouse	6	10	3-May	25-May	3	19-May
Sora	5	8	27-May	31-May	2	many days
Sandhill Crane	2	7	11-May	14-May	5	11-May
American Golden-Plover	2	3	23-May	25-May	2	25-May
Semi-palmated Plover	4	4	17-May	26-May	1	all days

Species	# of Days	Bird Days	First Date	Last Date	High Count (#)	High Count (Date)
Greater Yellowlegs	3	3	29-May	31-May	1	all days
Lesser Yellowlegs	20	40	7-May	28-May	6	10-May
Solitary Sandpiper	17	34	9-May	31-May	4	22-May
Spotted Sandpiper	7	8	15-May	29-May	2	27-May
Whimbrel	1	1	24-May	-	1	24-May
Wilson`s Snipe	25	79	5-May	31-May	25	6-May
Least Sandpiper	3	3	16-May	18-May	1	all days
Baird's Sandpiper	1	1	26-May	-	1	26-May
Pectoral Sandpiper	2	31	17-May	29-May	30	17-May
Long-billed Dowitcher	2	9	17-May	20-May	8	20-May
<i>Unidentified Shorebird</i>	4	66	7-May	20-May	48	20-May
Mew Gull	16	51	3-May	28-May	14	9-May
Herring Gull	4	5	19-May	28-May	2	28-May
Bonaparte's Gull	5	24	10-May	21-May	15	11-May
<i>Unidentified Gull</i>	1	2	13-May	-	2	13-May
Arctic Tern	3	4	11-May	28-May	2	23-May
Eurasian Collared Dove	1	1	28-May	-	1	28-May
Barred Owl	19	19	10-May	29-May	1	all days
Belted Kingfisher	16	25	13-May	31-May	3	19-May
Yellow-bellied Sapsucker	17	75	15-May	31-May	9	24-May
Hairy Woodpecker	4	5	8-May	26-May	2	26-May
American Three-toed Woodpecker	18	22	8-May	29-May	2	many days
Northern Flicker	16	26	11-May	27-May	5	19-May
Pileated Woodpecker	3	3	23-Apr	6-May	1	all days
<i>Unidentified Woodpecker</i>	1	1	15-May	-	1	15-May
Olive-sided Flycatcher	3	3	19-May	25-May	1	all days
Western Wood-Pewee	8	9	18-May	29-May	2	21-May
Alder Flycatcher	4	8	25-May	31-May	3	28/31 May
Least Flycatcher	8	21	24-May	31-May	6	28-May
Hammond's Flycatcher	19	37	11-May	31-May	4	21-May
Dusky Flycatcher	1	1	15-May	-	1	15-May
<i>Unidentified Empidonax Flycatcher</i>	1	1	25-May	-	1	25-May
Say`s Phoebe	2	2	17-May	21-May	1	both days
Northern Shrike	1	1	2-May	-	1	2-May
Blue-headed Vireo	1	1	27-May	-	1	27-May
Warbling Vireo	13	70	16-May	31-May	10	26-May
Gray Jay	33	90	23-Apr	31-May	5	many days
American Crow	5	6	27-Apr	28-May	2	7-May
Common Raven	33	99	23-Apr	31-May	10	5-May
Tree Swallow	25	282	7-May	31-May	25	28-May

Species	# of Days	Bird Days	First Date	Last Date	High Count (#)	High Count (Date)
Violet-green Swallow	8	27	16-May	28-May	9	19-May
Bank Swallow	8	22	17-May	30-May	10	28-May
Cliff Swallow	8	57	18-May	29-May	20	28-May
<i>Unidentified Swallow</i>	1	20	29-May	-	20	29-May
Black-capped Chickadee	35	109	23-Apr	31-May	10	15-May
Boreal Chickadee	17	34	30-Apr	29-May	5	6-May
Red-breasted Nuthatch	5	5	16-May	28-May	1	all days
Ruby-crowned Kinglet	31	222	23-Apr	31-May	24	6-May
Mountain Bluebird	1	4	3-May	-	4	3-May
Gray-cheeked Thrush	3	21	21-May	23-May	12	21-May
Swainson`s Thrush	13	75	10-May	31-May	30	21-May
Hermit Thrush	6	7	11-May	27-May	2	14-May
American Robin	28	161	2-May	31-May	17	9-May
Varied Thrush	21	38	2-May	29-May	4	6-May
<i>Unidentified Thrush</i>	1	13	12-May	-	13	12-May
American Pipit	12	45	5-May	24-May	15	5-May
Bohemian Waxwing	21	58	7-May	31-May	7	25-May
Lapland Longspur	13	183	1-May	16-May	139	9-May
Tennessee Warbler	8	117	24-May	31-May	18	many days
Orange-crowned Warbler	18	124	8-May	25-May	16	17-May
Yellow Warbler	10	49	17-May	29-May	11	24-May
Cape May Warbler	8	12	24-May	31-May	2	many days
Myrtle Warbler	24	303	6-May	31-May	80	21-May
Townsend`s Warbler	3	3	19-May	28-May	1	all days
Blackpoll Warbler	11	21	10-May	31-May	3	many days
Black-and-white Warbler	1	1	26-May	-	1	26-May
American Redstart	7	32	25-May	31-May	7	29-May
Ovenbird	1	1	28-May	-	1	28-May
Northern Waterthrush	23	211	8-May	31-May	39	21-May
Common Yellowthroat	14	105	16-May	31-May	16	27-May
Wilson`s Warbler	22	407	7-May	29-May	50	17-May
American Tree Sparrow	14	106	7-May	23-May	25	10-May
Chipping Sparrow	7	30	25-May	31-May	5	many days
Savannah Sparrow	22	133	6-May	31-May	17	21-May
Fox Sparrow	15	220	7-May	23-May	65	10-May
Lincoln's Sparrow	26	176	6-May	31-May	13	8/9 May
Swamp Sparrow	9	25	23-May	31-May	5	28-May
White-throated Sparrow	13	82	18-May	31-May	17	30-May
White-crowned Sparrow	20	826	3-May	26-May	270	7-May
Golden-crowned Sparrow	16	54	5-May	23-May	8	8-May

Species	# of Days	Bird Days	First Date	Last Date	High Count (#)	High Count (Date)
Slate-colored Junco	24	220	5-May	29-May	40	10-May
<i>Unidentified Sparrow</i>	1	2	20-May	-	2	20-May
Western Tanager	11	13	18-May	31-May	3	27-May
Red-winged Blackbird	19	30	12-May	31-May	4	25-May
Rusty Blackbird	18	68	7-May	31-May	22	9-May
Brown-headed Cowbird	20	35	11-May	31-May	4	29-May
<i>Unidentified Blackbird</i>	1	7	23-May	-	7	23-May
Gray-crowned Rosy-Finch	4	4	29-Apr	2-May	1	all days
Pine Grosbeak	1	1	11-May	-	1	11-May
Purple Finch	13	15	10-May	29-May	2	17/23 May
Pine Siskin	19	274	13-May	31-May	40	23-May
Common Redpoll	20	691	23-Apr	24-May	155	7-May
Hoary Redpoll	3	3	23-Apr	9-May	1	all days
<i>Unidentified Small Passerine</i>	1	21	5-May	-	21	5-May