

Iona Island Bird Observatory

# 2017 Annual Report

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Iona Island Bird Observatory (IIBO) is a program run by non-profit organization, WildResearch.

*WildResearch's mission is to build, train, and educate a community that contributes to conservation science.*



The Iona Island Bird Observatory is situated at Iona Regional Park. Use of the park is permitted by Metro Vancouver Regional Parks.



Major Funding for IIBO in 2014 was provided by the Sitka Foundation



Purchase of volunteer scheduling software, Better Impact, for 2017 and beyond was made possible by:



## Acknowledgements

Significant thanks and gratitude is owed to many supporters of IIBO in 2017, including the following individuals and collaborators:

Metro Vancouver Regional Park has supported and facilitated the use of Iona Beach Regional Park for IIBO from 2010-2017. Big thanks to Iona Beach Regional Park Facilitators, Melanie Blendell for assistance with lane clearing, path upgrades, Markus Merkens, and Robyn Worcester, Parks West Area *Natural Resource Management Specialist* for permitting support.

Funding received toward IIBO has allowed for program expansion and increased program capacity. Major funding for 2017 was generously provided by the Sitka Foundation, allowing for equipment purchase, and wages towards seasonally hired contractors (bander-in-charge and assistant banders). Because of the specialized work involved in bird banding, the success of the IIBO program continues to be tied to our ability to attract and hire knowledgeable and skilled contractors, who further advance membership training and community building at IIBO.

Volunteer scheduling software for the 2017 IIBO program was made possible by a grant from Mountain Equipment Co-op (MEC) for purchasing Better Impact. We thank Renae Mackas, Angela Bond, and Courtney Lahue for coordinating volunteer requests from new and interested volunteers and for preparing the Better Impact schedule and sending reminder shift emails to those signed up to attend shifts at IIBO!

Finally, several banders contributed to IIBO as paid contractors or volunteers in 2017, including: Anna Szeitz, Azim Shariff, Dan Froehlich, Micah Scholer, Yousif Attia, Conny Bregman, and Julian Heavyside. Thank you for going that extra mile to provide a positive learning environment for volunteers, encouraging training and development for those attending IIBO, and for highlighting WildResearch's work at IIBO to park attendees and visiting groups.

Program Management in 2017 was provided by the two program managers: Andrew Huang and Azim Shariff. Duties included: annual permitting requests and reporting, grant reporting, contractor and data management, program and volunteer outreach, support to authors/review of annual IIBO reports, scheduling banding demonstration group visits, managing collaborations, and overseeing site maintenance. The current report was reviewed and edited by Andrew Huang and Azim Shariff.

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## HIGHLIGHTS

- Spring banding resulted in the highest capture rate (1.43/net hour) compared to all previous years since 2010 (0.44 – 1.04 birds/net hour), and high species richness (50 species).
- Fall banding also resulted in relatively high capture rate (1.12 bird net hour) and number of species caught (44 species) compared to previous years.
- Most abundant species included Wilson's Warbler (N=865), Orange-crowned Warbler (N=288), and Ruby-crowned Kinglet (N=194) during spring, and Fox Sparrow (N=188), Song Sparrow (N=167), and Yellow Warbler (N=143) during fall.
- Banding demonstration was provided to over 200 guests visiting IIBO as a means of outreach education.
- WildResearch volunteers donated 1670 hours of their time at IIBO in 2017 – this is nearly equivalent to hiring a full-time employee for the whole year!

## EXECUTIVE SUMMARY

WildResearch is a membership based, charitable, non-profit organization that operates Iona Island Bird Observatory (IIBO). WildResearch's mission is to build, train, and educate a community that contributes to conservation science. WildResearch develops and runs citizen science programs like IIBO because it enables us to conduct conservation science research while offering skills to our membership, and engaging the public with the nature around them.

At IIBO, WildResearch monitored avian populations in 2017 during spring (April 15<sup>th</sup>-May 31<sup>st</sup>), fall (Aug 19<sup>th</sup> -Oct.30<sup>th</sup>) and winter (Nov. 25<sup>th</sup>-Dec 10<sup>th</sup>) in Iona Beach Regional Park in Richmond, BC using passive mist-netting. The two migration monitoring programs, Spring Migration Monitoring Program (SMMP) and Fall Migration Monitoring (FMMP) aim to monitor population and migratory trends and collect information about annual and long-term trends in breeding productivity. The Winter Songbird Monitoring Program (WSMP)'s long-term objective is to determine over-winter survival rates and species diversity in the area.

Birds were captured using mist nets and banded. Standard measurements were taken for all banded birds. The IIBO was in operation for 4,068 net hours with 4,235 new birds captured for a total capture rate of 1.26 birds per net hour. This is over double the capture rate of the Vancouver Avian Research Center's Colony Farms Banding Station in 2017 (0.55 birds / net; Vancouver Avian Research Centre 2017 Annual Report).

The 2017 SMMP exhibited exceptionally high capture rates and bird diversity, supporting previous SMMP findings that the Iona Island area is ecologically significant as a bird migratory stop-over site. During the SMMP, 2,806 birds were newly caught and 464 birds were recaptured over 40 banding days, over 2,278 mist-net hours. Monitored birds included 50 species with a catch rate of 1.23 birds/net hour for new birds and 0.20

birds/net hour for recaptures. Wood warblers, including Wilson's Warblers and Orange-crowned Warblers dominated the captures during spring migration.

Point count surveys were completed as a component of the SMMP monitoring methods in 2017. Through this supplemental survey method, 8,111 individuals of 89 species of birds were recorded around IIBO. Point count surveys allowed for monitoring of species using Iona Beach Regional Park that were not represented in capture data. A total of 125 species were recorded at IIBO during the 2017 SMMP. Of these 125 species, 65 species were recorded during point count surveys that were not captured during passive mist-netting.

The 2017 FMMP was also productive for IIBO and took place over 29 banding days. A total of 1,383 birds were newly captured and 281 individual birds were recaptured. 44 were captured with a capture rate of 0.88 new birds/net hour and 0.23 recaptures/net hour. Song Sparrows and Fox Sparrows were the most commonly caught species, amounting to 25.8% of total captures. The number of mist-net hours in the fall was 1571 hours.

The 2017 WSMP monitored large numbers of resident birds over 3 fair-weather banding days. Exactly 100 birds were captured over 219.5 mist net hours for a total capture rate of 0.46 birds per net hour. During the WSMP, 46 birds were newly captured and 48 unique birds were recaptured. Seventeen species were captured with a catch rate of 0.21 birds/net hour for new birds and 0.22 birds/net hour for recaptures.

From May to August, 2017, through the Canada Summer Jobs program, WildResearch hired a MSc student from Simon Fraser University, Laura Newberry, to collect baseline information on wildlife habitat usage at IIBO, including breeding songbirds, small mammals, amphibians, and reptiles. Findings from this summer research project can be found here (2017 Technical Report and Restoration Plan for Iona Beach Regional Park): [http://wildresearch.ca/wp-content/uploads/2015/10/WildResearch-2017-Technical-Report-and-Restoration-Plan-for-IBRP\\_180305.pdf](http://wildresearch.ca/wp-content/uploads/2015/10/WildResearch-2017-Technical-Report-and-Restoration-Plan-for-IBRP_180305.pdf)

In 2017, a total of 201 individuals were recorded visiting IIBO during group banding demonstrations including visits during the migration monitoring programs. Visiting groups included university/college classes, Nature Kids, and K-12 students. This year, WildResearch partnered with the Canadian Wildlife Service to provide a banding demonstration for the winner of the kid's program of the Pacific Flyway Ambassador project.

Avian monitoring at IIBO would not be possible without help from our numerous supporters and volunteers. WildResearch would like to acknowledge support from Metro Vancouver, funding from the Sitka Foundation, BC Nature, and BC Naturalist Foundation.

We extend our sincere thanks to all those who volunteered at IIBO, the hard work and dedication of so many enthusiastic birders ensured the success of the monitoring station. In 2017, 44, 35, and 4 people volunteered for the spring, fall, and winter monitoring programs, respectively. Volunteers donated more than 1670 hours of their time to run IIBO in 2017. We are grateful for the numerous volunteers who donated their time to our monitoring program and ultimately contributing to conservation science.



## 1. INTRODUCTION

### 1.1. Avian Monitoring Programs

Through the spread of urbanization and the intensive agriculture needed to support a rapidly growing population, humans have occupied many high-value habitats in the world, principally estuaries, riverine valley bottoms, and wetlands (McKinney 2002). Urban developments are often found near large bodies of water, estuaries, rich productive land, and/or riparian areas that are biologically important. The residual urban green spaces provide refuges, resource sources, dispersal corridors, wintering habitat, and migratory stopovers for avian species that traditionally relied on the landscapes that urban areas now occupy (Ohmart 1994; Bolger et al. 2001; Melles et al. 2003; Sandstrom et al. 2006). Using weather surveillance radars, a recent study has demonstrated that migrating birds are attracted to areas with more artificial lighting, using them as stopover sites (McLaren et al. 2018). This highlights the importance of preserving and protecting green space and parks with suitable habitat within an urban landscape.

WildResearch is a charitable organization whose goals are wildlife research and monitoring, environmental education, and community engagement through training and outreach. This organization believes that wildlife use in these semi-natural habitats is important for supporting wildlife communities, and should be further investigated. The IIBO program serves to increase our knowledge of such communities.

### 1.2. Iona Island Bird Observatory

Iona Island Bird Observatory (IIBO) has been in operation since 2010 and continues to serve as one of WildResearch's core programs. IIBO is located within Iona Island Regional Park, immediately north of the Vancouver International Airport in Richmond, BC (Figure 1), and is maintained by Metro Vancouver Regional Parks. This urban park is an isolated patch of riparian and meadow habitat that is surrounded by an expanding matrix of residential, commercial and industrial development. The park has been demonstrated in previous years to act as a stop-over for a variety of passerines (IBA Canada 2017; Toochin 2014a). It has been designated an Important Bird Area by Birdlife International and its local partners, Bird Studies Canada and BC Nature. The Sitka Foundation has provided significant funding to WildResearch for operating IIBO.

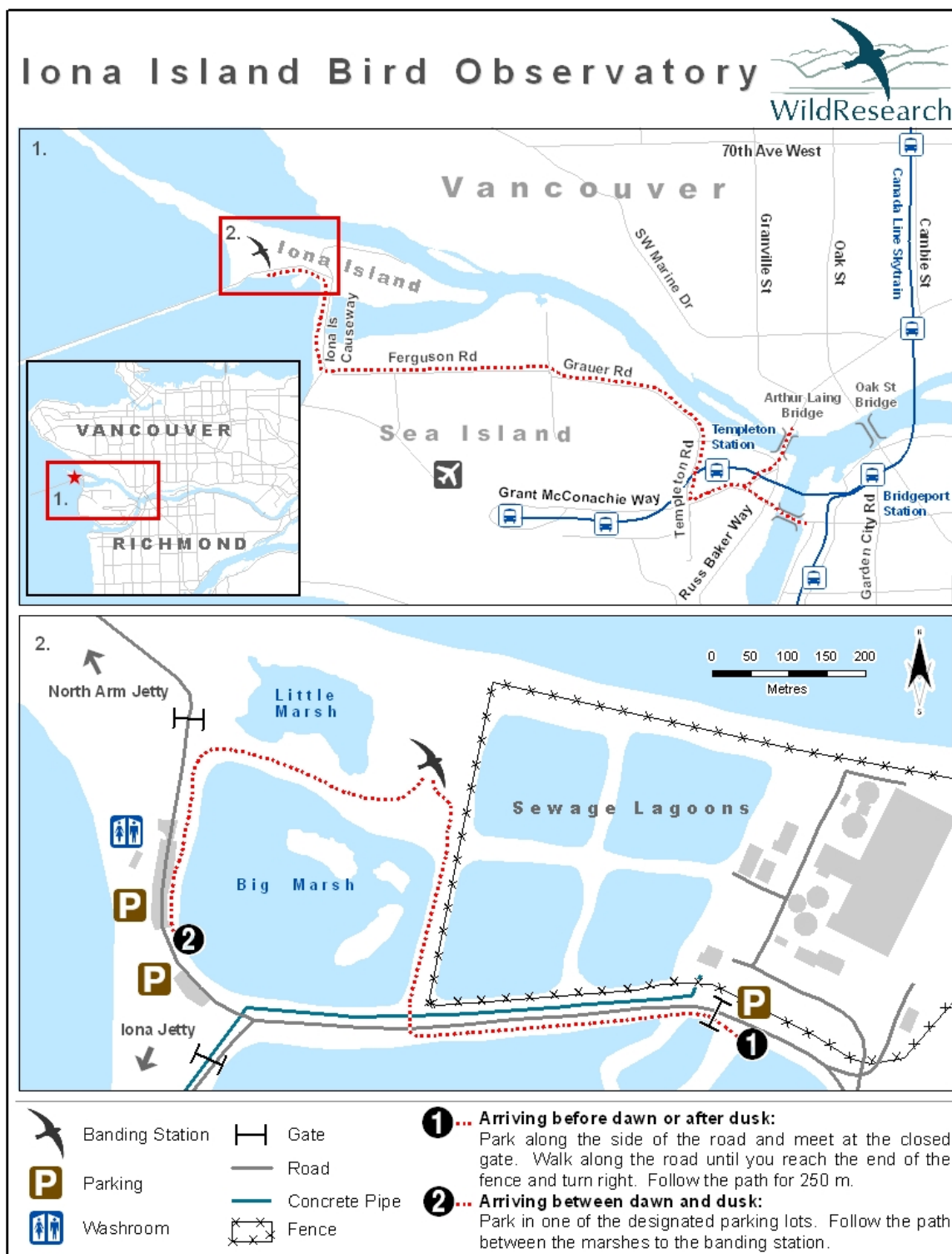


Figure 1. The Iona Island Bird Observatory is located at Iona Beach Regional Park in Richmond, British Columbia.

### 1.3. IIBO Programs Overview

IIBO conducts three distinct avian population monitoring programs with the following objectives:

- Spring Migration Monitoring Program (SMMP), monitoring population abundance, species diversity, migratory trends, local stopover length, and long-term trends during the spring migratory period as birds relocate from their wintering grounds to their breeding grounds,
- Fall Migration Monitoring Program (FMMP), monitoring population abundance, species diversity, migratory trends, local stopover length, and long-term trends in breeding productivity during the fall migratory period as birds relocate from their breeding grounds to their wintering grounds, and
- Winter songbird monitoring Program (WSMP), monitoring winter resident species abundance, diversity, and survival rates.
- From May to August, 2017, through the Canada Summer Jobs program, WildResearch hired a MSc student from Simon Fraser University, Laura Newberry, to collect baseline information on wildlife habitat usage at IIBO, including breeding songbirds. Findings from this summer research project can be found here: [http://wildresearch.ca/wp-content/uploads/2015/10/WildResearch-2017-Technical-Report-and-Restoration-Plan-for-IBRP\\_180305.pdf](http://wildresearch.ca/wp-content/uploads/2015/10/WildResearch-2017-Technical-Report-and-Restoration-Plan-for-IBRP_180305.pdf)

Overall these programs are designed to monitor the abundance, diversity, annual productivity, survival and stop-over ecology of birds that use this urban park. IIBO is one of nine bird observatories currently operational in British Columbia, allowing the opportunity to compare data at local and regional scales within the province. These programs also provide educational opportunities whereby volunteers work alongside experienced ornithologists, learning to identify, safely handle, and band captured species.

## 2. METHODS

In 2017, all three IIBO programs employed the same sampling design, which features 14 mist net lanes, each of which are 12 m long (Figure 2). Net locations are representative of habitat diversity and plant species compositions in Iona Island Regional Park, including wetland and riparian habitat and native as well as invasive plant species assemblages (Bishop and Forrester 2012; Shariff 2015). Nets are set up such that the bottom of the net is 30 – 40 cm above the ground (Boyd 2012). Nets are opened a half hour before sunrise and remain open for up to 6 hours provided that weather conditions, such as wind, rain, and cold temperatures do not endanger bird health or safety. Net rounds are conducted every 20 to 30 minutes, depending on weather, to minimize the amount of time birds spend in the nets (RISC 1998; NABC 2001; Fair et al 2010; Boyd 2012; Mackenzie and Gahbauer 2014).

Special care is taken to train volunteers to adhere to IIBO's banding protocol, and a Bander-in-Charge (BIC) with an active master or sub- banding permit is present at all times to ensure adherence to banding protocols (Boyd 2012). All volunteers are taught to handle birds using bander's and photographer's grips (NABC 2001); both of which can be used during extraction (Boyd 2012). All staff and volunteers carry radios so that volunteers can request assistance from the BIC to ensure bird safety during difficult extractions (Boyd 2012).



*Figure 2. Map depicting the Iona Island Bird Observatory, including the 14 mist-net locations.*

Once extracted, birds are carefully placed individually in cloth bags using bander's grip to prevent injuring birds and brought to the banding station (Boyd 2012). At the station, birds are stored within their individual cloth bags hung up on hooks to ensure bird safety, and birds are processed on a first-in first-out basis to minimize handling time, with the exception of more sensitive species or individuals that are processed sooner (Boyd 2012). During processing, banders record the following information: species (subspecies where possible), age (hatch-year, second-year, after-second-year, after-hatch-year, or unknown),



sex (male, female, or unknown), wing chord, weight, and fat score. Capture net and time are also recorded. All new birds (birds that had not been previously captured) are fitted with a Canadian Wildlife Service-issued aluminum butt-end band marked with a unique eight or nine-digit band number. For all birds that have been previously captured (recaptures), banders recorded their unique band number, collect age and body condition data, and release the bird. Birds that were captured but unprocessed and birds that were captured and banded prior to 2017 and recaptured in 2017, were both analyzed as “new” birds for 2017. Birds banded in 2017 which were recaptured are referred to in the report as recaptures.

For ease of reporting, subspecies of Yellow-rumped Warbler (Audubon’s Warbler and Myrtle Warbler), Dark-eyed Junco (Slate- coloured Junco and Oregon Junco), and Traill’s Flycatcher (Alder Flycatcher and Willow Flycatcher) are listed as separate species in this report. Moreover, hummingbirds were not processed or banded but they were included in the count as new birds.

### 3. RESULTS AND DISCUSSION

#### 3.1. Spring Migration Monitoring Program

During 2017, the SMMP ran daily from April 15 to May 31. The SMMP included constant-effort mist-netting and collection of morphometric and other data from each bird captured. Banding was possible on 40 fair weather days during that period, for a total effort of 2277.73 net hours.

A total of 2,806 bird captures from 50 species occurred during the SMMP (Appendix A Table A1). This is above the average species richness captured in the spring between 2010 and 2015 (38 species) based on the cumulative report for those years (Table 1) (Kissel and Scholefield 2016). The overall mean capture rate (1.43 birds/net hour) in 2017 was the highest compared to all previous years (Table 1). The highest number of birds captured was on May 4<sup>th</sup> with 286 captures, followed by a few smaller peaks on May 10<sup>th</sup> and 18<sup>th</sup> with 164 and 189 captures respectively (Figure 3). New birds were captured at a rate of 1.23 birds/net hour, and 464 birds were recaptured from 35 species at a capture rate of 0.20 birds/net hour.

The top five most frequent new captured birds accounted for 61% of new captures and like previous years were nearly all warbler species (Table 1; Table 2). These included Wilson’s Warbler, Orange-crowned Warbler, Ruby-crowned Kinglet, Audubon’s Warbler, and Yellow Warbler in respective order from most to least (Table 2). These findings are consistent with trends in the top species captured on Iona Island in the spring in previous years (Kissel and Scholefield 2016). Wilson’s Warbler, Ruby-crowned Kinglet, Orange-crowned Warbler, American Goldfinch, and Song Sparrow were the five most frequently recaptured species, accounting for 82% of all recaptures (Table 2). Of the total recaptures, 17 % were recaptured more than once (Appendix A Table A1). Age ratios of SY to ASY birds for the top five species for newly captured and recaptured combined were between 0.5:1 and 2.1:1

(Table 2). However, not all birds banded during SMMP were aged into the SY or ASY categories. This indicates that Iona Beach Regional Parks provide important habitat for both younger and older birds.

For the top five species during the SMMP, Ruby-crowned Kinglets captures were the highest in mid-April, followed by a steady decrease (Figure 4a). This songbird species is known to overwinter at Iona Beach Regional Park and likely increasingly emigrate to other areas to breed during the SMMP. Our capture data also clearly depicts differential migration timing amongst the warbler species. Audubon's and Orange-crowned Warblers dominate most of the captures in early May, whereas the abundance of Wilson's and Yellow Warblers begin to peak in mid-May (Figure 4b, c, d, e).

All hummingbirds were left unprocessed due to their small leg size and their need for a unique banding method. As such, a different federal station banding permit is required which the IIBO does not hold. Therefore, no recapture data was recorded for Hummingbirds and all captures were recorded as "new".

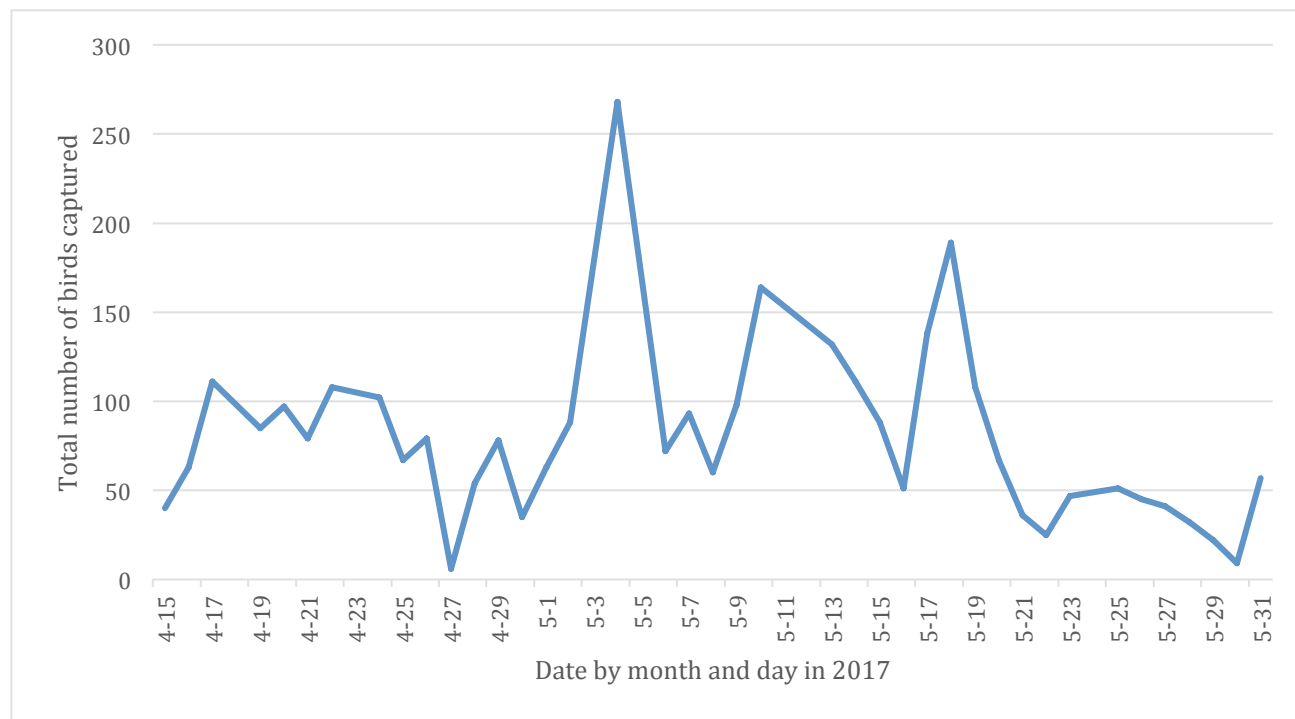
Other interesting captures included 2 Swamp Sparrows (Figure 5) which are noted to breed further east in interior BC but do occur as a non-breeder or passing migrant at Iona. Townsend's Warbler was another notable species, which are known to breed more frequently in coniferous forests (Figure 6). Only 42 Violet-green Swallows were captured this year, where as in 2011, this species was one of the top 5 species to be captured, with 143 banded (Boyd 2012).

*Table 1. Top 5 species monitored, capture rate, total # of birds caught, and # of species caught during Spring Migration Monitoring Programs over the past 8 years at IIBO.*

Rank	2010	2011	2012	2013	2014	2015	2016	2017
1	Wilson's Warbler	Violet-green Swallow	Audubon's Warbler	Wilson's Warbler	Wilson's Warbler	Wilson's Warbler	Wilson's Warbler	Wilson's Warbler
2	Orange-crowned Warbler	Audubon's Warbler	Myrtle Warbler	Yellow Warbler	Audubon's Warbler	Orange-crowned Warbler	Rufous Hummingbird	Orange-crowned Warbler
3	Ruby-crowned Kinglet	Song Sparrow	Wilson's Warbler	Orange-crowned Warbler	Myrtle Warbler	Audubon's Warbler	Orange-crowned Warbler	Ruby-crowned Kinglet
4	Lincoln's Sparrow	Red-winged Blackbird	Orange-crowned Warbler	Myrtle Warbler	Orange-crowned Warbler	Myrtle Warbler	Common Yellowthroat	Audubon's Warbler
5	Audubon's Warbler	Tree Swallow	Ruby-crowned Kinglet	Audubon's Warbler	Ruby-crowned Kinglet	Yellow Warbler	Lincoln's Sparrow	Yellow Warbler
Birds / net hour	1.04	0.73	NA	0.89	0.99	0.58	0.44	1.43
Total # of birds caught	604	205	NA	1367	1898	1476	1232	2806
# of species caught	33	26	NA	47	47	50	47	50

*Table 2. Most commonly captured bird species during the Spring Migration Monitoring Program with age ratios for individuals aged to HY and AHY.*

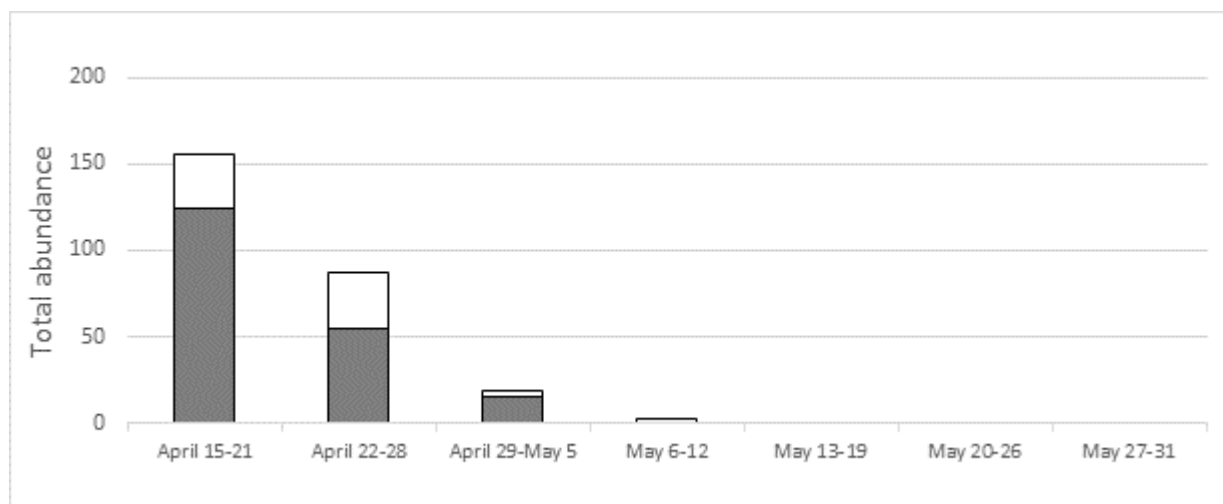
Species	# of newly captured individuals	% of total new individuals	# of recaptured individuals	# of total recaptured individuals	Aged to HY or AHY	Age ratios (HY: AHY)
Wilson's Warbler	865	31	157	41	779	1.7:1
Orange-crowned Warbler	288	10	44	12	262	1.0:1
Ruby-crowned Kinglet	194	7	69	18	176	2.1:1
Audubon's Warbler	182	7	n/a	n/a	175	0.5:1
Yellow Warbler	171	6	n/a	n/a	160	1.0:1
American Goldfinch	n/a	n/a	21	6	n/a	n/a
Song Sparrow	n/a	n/a	18	5	n/a	n/a



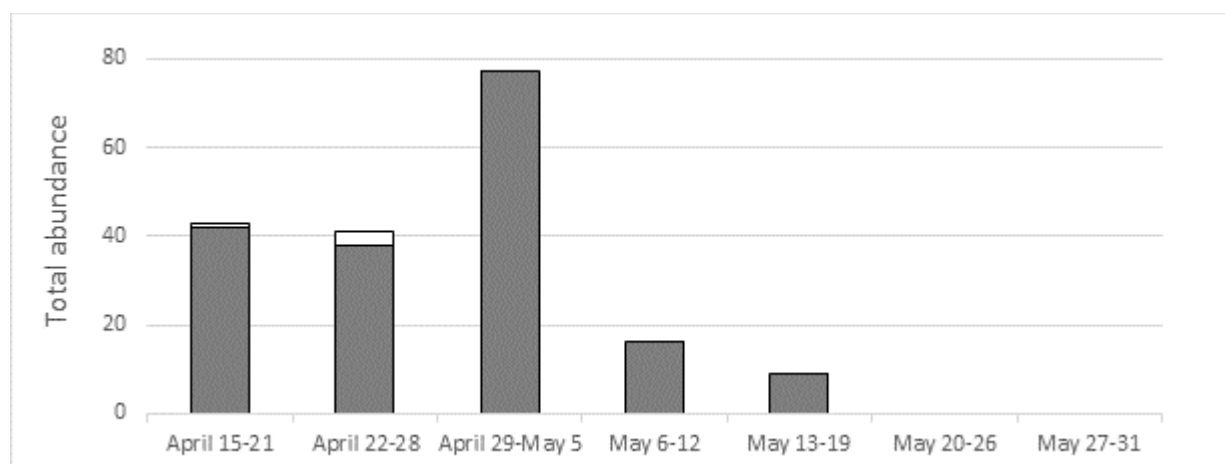
*Figure 3. Total number of birds capture during the 2017 Spring Migration Monitoring Program. Dates for which mist netting did not occur include: April 18, 23 and May 3, 5, 11, 12 and 24.*



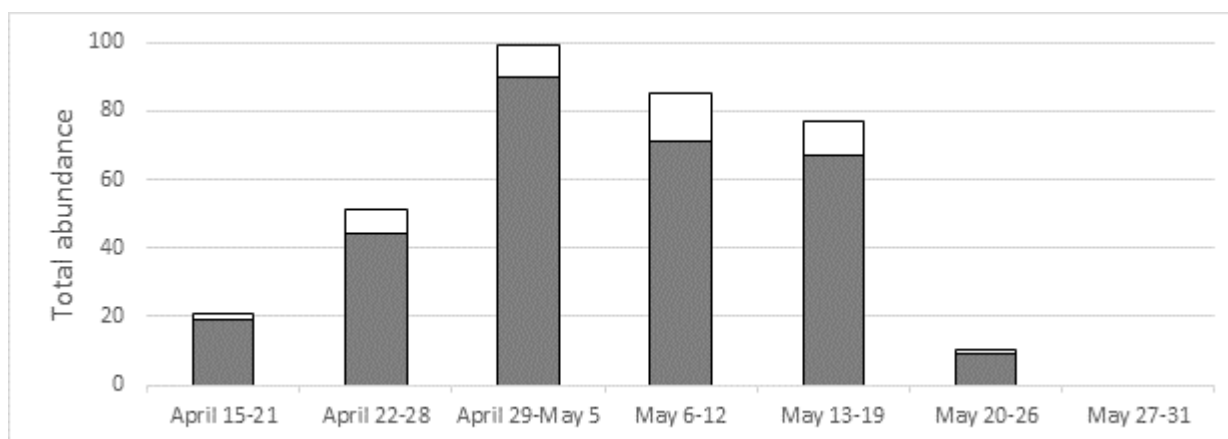
a) Ruby-crowned Kinglet



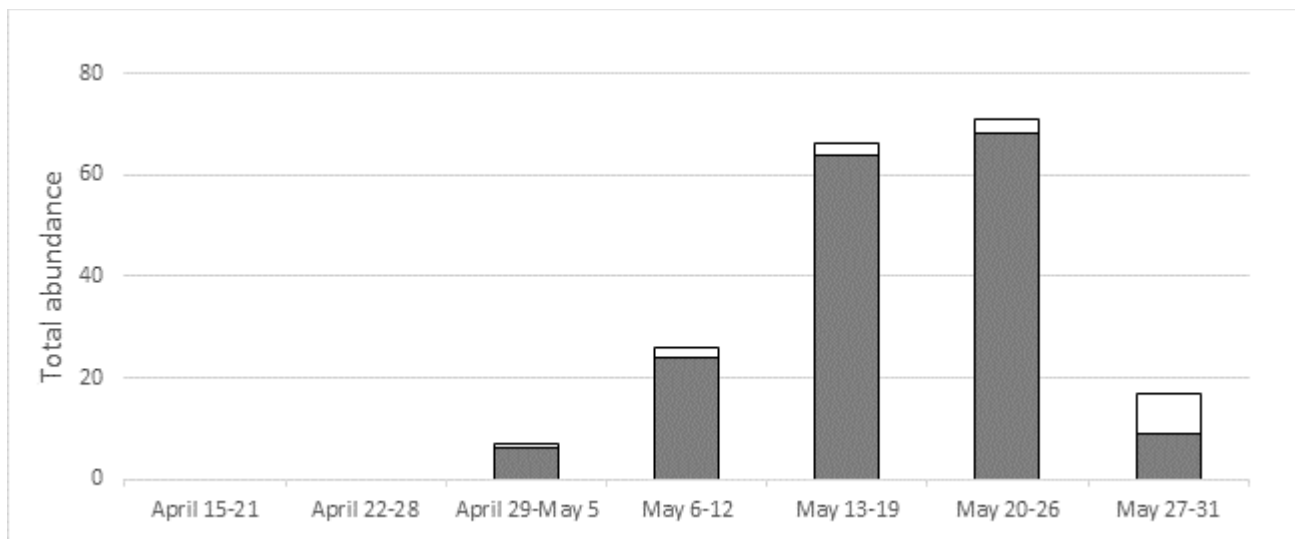
b) Audubon's Warbler



c) Orange-crowned Warbler



d) Yellow warbler



e) Wilson's warbler

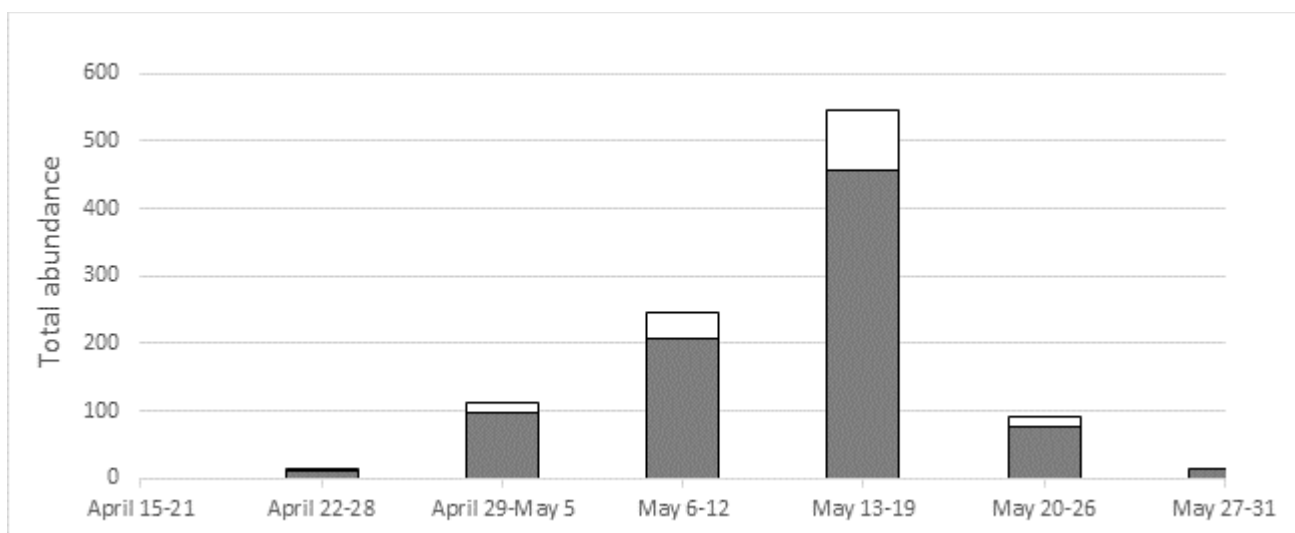


Figure 4. Trends in the total number of birds caught over the 2017 SMMP for the top five species captured (a-e). New captures indicated by grey; recaptures indicated by white.



*Figure 5. One of the 2 Swamp Sparrows (*Melospiza georgiana*) caught during the SMMP.*



*Figure 6. Townsend's Warbler (*Setophaga townsendi*) caught during the SMMP.*

### 3.2. Fall Migration Monitoring Program

The FMMP operated 3 days per week from August 19th to October 30th in 2017. During the 29 fair-weather days within that period, a total effort of 1570.75 net hours were achieved. The FMMP yielded 1,758 captures with an average overall capture rate of 1.12 birds per net hour. The 2017 capture rate is higher than all previous years except for 2014 whereby the capture rate was exceptionally high (1.60 birds/net hour; Table 3). Of the total captures in 2017, 1,383 individuals of 44 species were new birds, with a capture rate of 0.88 birds per net hour, while 281 individuals from 25 species were recaptured at an average rate of 0.23 birds per net hour (Appendix A Table A2).

Among new captures, Fox Sparrows, Song Sparrows, Yellow Warblers, Golden-crowned Sparrows and Orange-crowned Warblers were the top five most frequent new captured species, representing 53% of all new captures (Table 4). All species were also listed as the top 5 most abundant songbird species in previous years, except for Golden-crowned Sparrow. In 2017 we captured 115 Golden-crowned Sparrows, which is known to be a common overwintering species in the Lower Mainland. Yellow Warbler and Orange-crowned Warbler abundance peaked in mid-September and began tapering off by late September. This is similar to capture trends of the top five most common species from the 2016 (Owen 2017) and 2015 FMMP (Buehler and Nathan 2016). Yellow Warblers were completely absent by October 7-9, as they migrate to Mexico and South America to overwinter. In comparison, while most Orange-crowned Warblers overwinter in Mexico and southern U.S., a small overwintering population is known to occur in the Lower Mainland; this is reflected in the near-complete absence of their occurrence at IIBO towards the end of the season.

The top five recaptures were Fox Sparrows and Song Sparrows, Black-capped Chickadees, Spotted Towhees and Ruby-crowned Kinglets (Table 4), representing 64% of all recaptures. Of the total unique recaptured individuals, 24% were recaptured more than once (Appendix A Table A2). The high recapture rate likely reflects the fact that the 5 species are known to overwinter in Iona. Towards the end of the fall season, there was a sudden increase in the proportion of recaptures to new captures for Fox Sparrows (Figure 7), indicating that Fox Sparrows began settling in their overwintering grounds at Iona by October 14-15. Song Sparrow and Golden-crowned Sparrow, on the other hand, showed relatively equal ratio of new captures to recaptures.

For the top five species newly captured and recaptured combined, this resulted in HY:AHY ratios between 0.66:1 and 10.5:1 for the top five species (Table 5). The results indicate that Iona is an important migration stopover and wintering site for both young and adult birds.

Notable species caught during the FMMP included Red-breasted Nuthatch (Figure 8), a resident songbird species typically found in dense coniferous forests, and Northern Harrier (Figure 9), a raptor species known to overwinter in the Lower Mainland, circling above in open fields hunting for small mammals and birds. Although we could not band the Northern Harrier due to its leg size being much larger than our target species, we determined it as a young female, hatched year in 2017 – a very exciting bird to see up close!

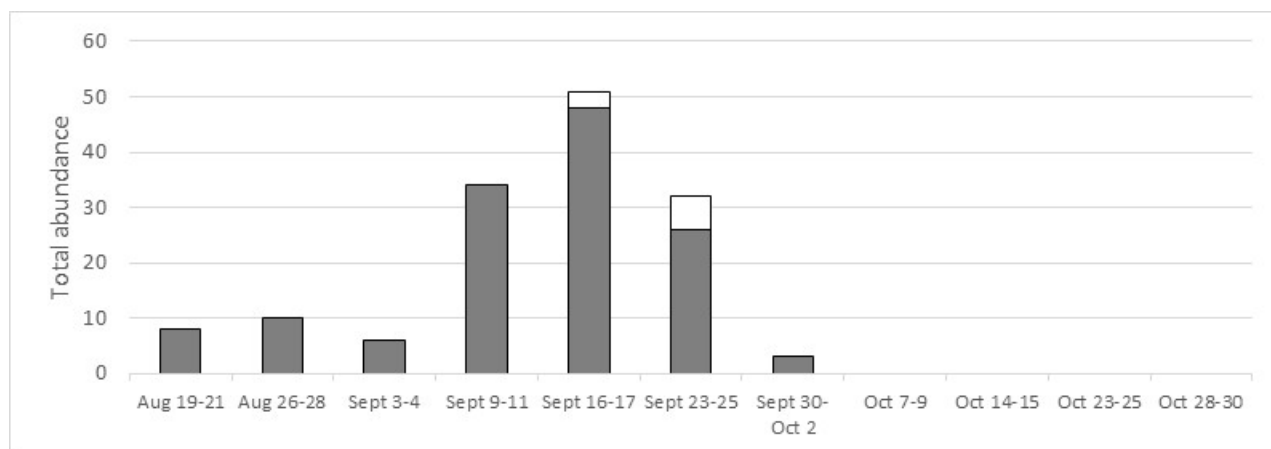
*Table 3. Top 5 species monitored, capture rate, total # of birds caught, and # of species caught during Fall Migration Monitoring Programs over the past 8 years at IIBO.*

Rank	2010	2011	2012	2013	2014	2015	2016	2017
1	Yellow Warbler	Fox Sparrow	Yellow Warbler	Yellow Warbler	Yellow Warbler	Song Sparrow	Yellow Warbler	Fox Sparrow
2	Orange-crowned Warbler	Song Sparrow	Audubon's Warbler	Orange-crowned Warbler	Audubon's Warbler	Fox Sparrow	Ruby-crowned Kinglet	Song Sparrow
3	Common Yellowthroat	Yellow Warbler	Song Sparrow	Fox Sparrow	Myrtle Warbler	Golden-crowned Kinglet	Song Sparrow	Yellow Warbler
4	Lincoln's Sparrow	House Finch	Orange-crowned Warbler	Song Sparrow	Song Sparrow	Ruby-crowned Kinglet	Common Yellowthroat	Golden-crowned Sparrow
5	Wilson's Warbler	Lincoln's Sparrow	Fox Sparrow	Ruby-crowned Kinglet	Yellow-rumped Warbler	Yellow Warbler	Song Sparrow	Orange-crowned Warbler
Birds / net hour	0.99	0.87	NA	1.19	1.60	0.35	1.05	1.12
Total # of birds caught	1728	442	NA	1887	2161	1272	1735	1383
# of species caught	47	41	NA	42	47	42	42	44

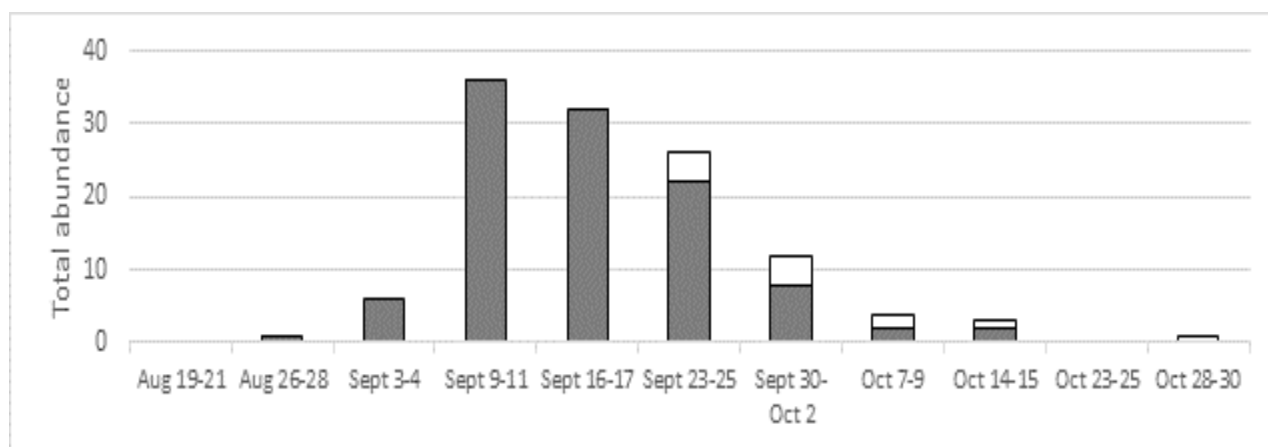
*Table 4. Most commonly captured bird species during the Fall Migration Monitoring Program with age ratios for individuals aged to HY and AHY.*

<b>Species</b>	<b># of newly captured individuals</b>	<b>% of total new individuals</b>	<b># of recaptured individuals</b>	<b># of total recaptured individuals</b>	<b>Aged to HY or AHY</b>	<b>Age ratios (HY: AHY)</b>
Fox Sparrow	188	14	101	27	187	8.35:1
Song Sparrow	167	12	41	11	154	5.16:1
Yellow Warbler	143	10	n/a	n/a	141	1.71:1
Golden-crowned Sparrow	115	8	n/a	n/a	23	10.50:1
Orange-crowned Warbler	108	9	n/a	n/a	108	0.66:1
Black-capped Chickadee	n/a	n/a	34	9	n/a	n/a
Spotted Towhee	n/a	n/a	32	9	n/a	n/a
Ruby-crowned Kinglet	n/a	n/a	29	8	n/a	n/a

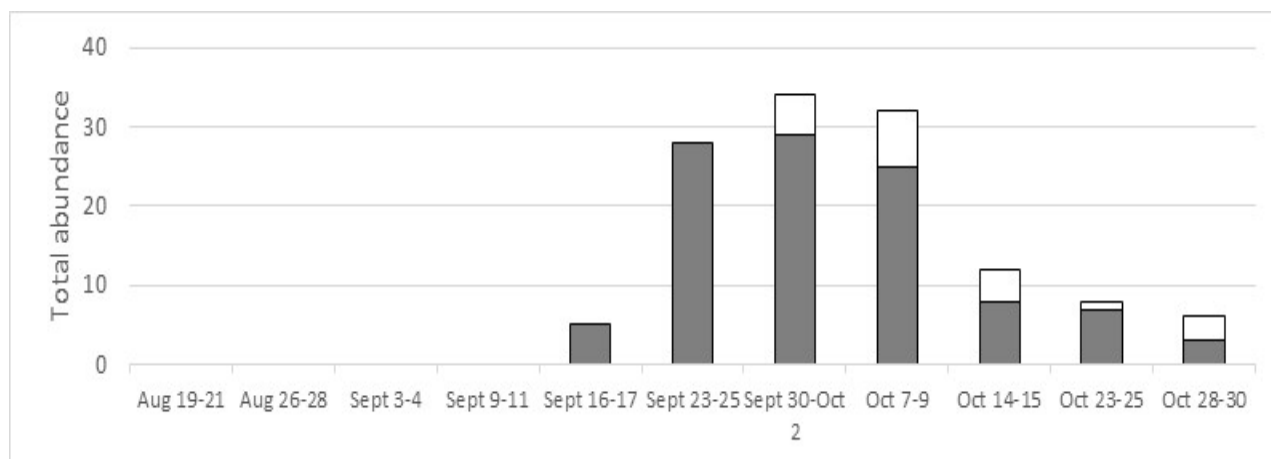
### a) Yellow Warbler



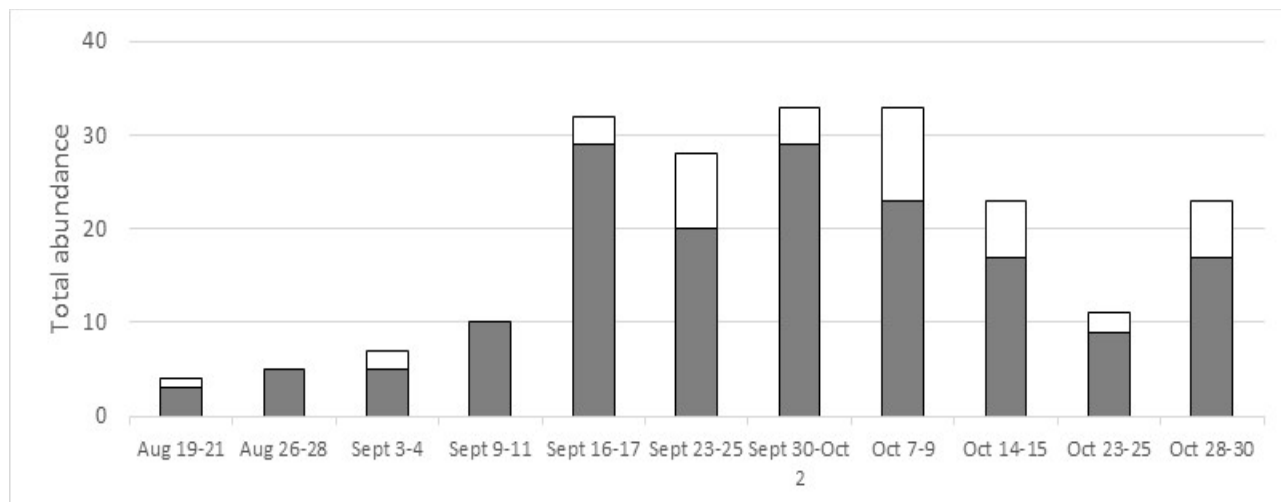
### b) Orange-crowned Warbler



### c) Golden-crowned Sparrow



#### d) Song Sparrow



#### e) Fox Sparrow

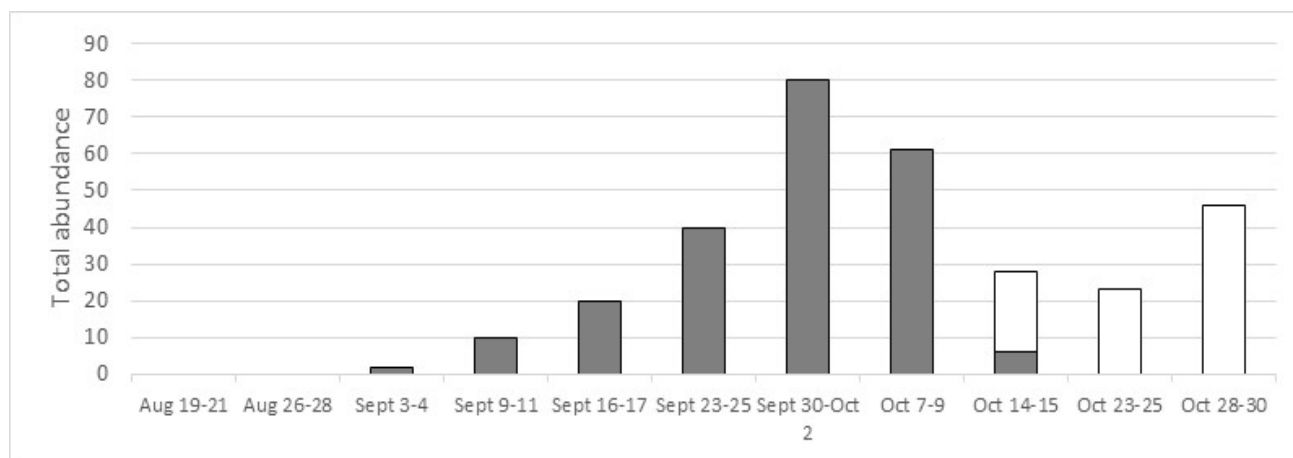


Figure 7. Trends in the total number of birds caught over the 2017 FMMP for the top five species captured (a-e). New captures indicated by grey; recaptures indicated by white.





*Figure 8. Red-breasted Nuthatch (*Sitta canadensis*) caught during the WSMP.*



*Figure 9. Julian Heavyside holding a Northern Harrier (*Circus cyaneus*) caught during the WSMP.*

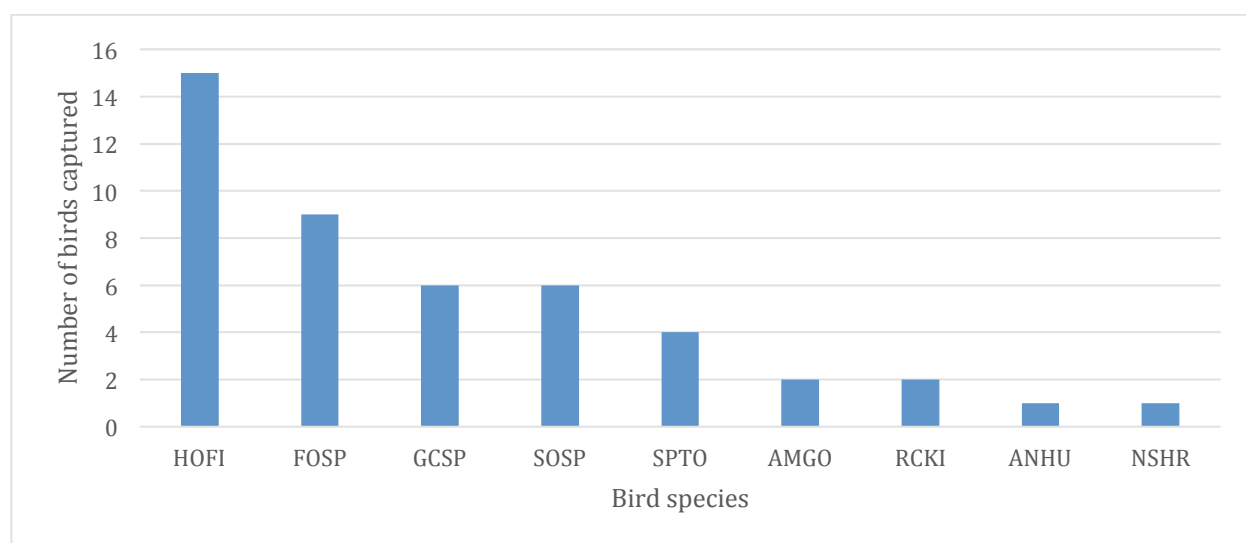
### 3.3. Winter Songbird Monitoring Program

The WSMP planned to run four days per month for November and December. However, inclement weather reduced operations to 3 days in total (Nov. 25, Dec. 3, and Dec 10) with a total mist net effort of 219.50 net hours. We continued with the WSMP from January to March 2018; however, the 2018 data was not included in this report. The WSMP yielded a total of 146 captures from 17 species (Figure 10), representing a total capture rate of 0.67 birds per net hour. Of these, 44 individuals of 9 species were new birds (capture rate of 0.21 birds/net hour) and 48 individuals from 9 species were recaptured birds banded in 2017 (recapture rate of 0.46 birds/net hour) occurred. (Appendix A Table A3).

The five most frequent new birds included House Finch, Fox Sparrow, Golden-crowned Sparrow, Song Sparrow, and Spotted Towhee, accounting for 85% of all new captures (Table 5). The top three most frequently recaptured species were Fox Sparrow, Spotted Towhee, and Song Sparrow. These species accounted for 86% of all recaptures (Figure 10). Rare captures during the WSMP included a Northern Shrike (Figure 11), also known as the “butcherbird” due to its renowned feeding habitat of impaling their prey on thorns and, sometimes, barbed wire.

*Table 5. Most Commonly Captured New Bird Species during the Winter Songbird Monitoring Program with age ratios for individuals aged to HY and AHY.*

Species	# of newly captured individuals	% of total new individuals	# of recaptured individuals	# of total recaptured individuals
House Finch	15	32	n/a	n/a
Fox Sparrow	9	19	21	39
Golden-crowned Sparrow	6	13	n/a	n/a
Song Sparrow	6	13	7	13
Spotted Towhee	4	9	15	28



*Figure 10. Total capture frequency by species during the Winter Songbird Monitoring Program.*



*Figure 11. Northern Shrike (*Lanius excubitor*) caught during the WSMP.*

#### 4. OUTREACH SUCCESS STORIES

Many inspiring moments occur at IIBO when we see first-hand the positive influence that experiences with nature have on the general public, and on children, youth, and elders alike. The two success stories below illustrate moments in 2017 that were inspiring.

Outreach and citizen science are at the heart of WildResearch's mission to build a community that is educated, trained, and involved in conservation science. Outreach initiatives at IIBO include group visits from the community, nature clubs, class visits from K-12 students, and university/college classes. The location of IIBO in Iona Beach Regional Park allowed for opportunities to engage with park users as well, who often stop by the banding station and show an interest in monitoring activities.

Volunteers contribute largely to all of WildResearch's programs and this includes all activities carried out at IIBO. WildResearch acknowledges the contributions of volunteers who donate their time to engage in migration monitoring activities during the SMMP and FMMP each year. It is because of their generous contributions that migration monitoring at IIBO is possible.

#### 4.1. IIBO Volunteer Summary

During the 2017 SMMP, 44 volunteers contributed 836.91 volunteer-hours to help run the IIBO banding station. During the 2017 FMMP, 37 dedicated volunteers donated 889.25 hours. During the WSMP, 4 volunteers donated 64 hours (Table 6). Volunteers contributed significantly to all of WildResearch's wildlife monitoring programs.

Apart from contracted banders, everyone who contributes time at IIBO during the migration monitoring programs does so as a volunteer. The data presented in this report is collected by these volunteers who collectively contribute to over 1,670 hours at IIBO per year (nearly equivalent to hiring a full-time employee!). Training provided by experienced banders resulted in many beginner volunteers rising to intermediate and advanced training levels, ensuring the continued success of the migration monitoring programs at IIBO and allowing volunteers to gain practical biological field skills. Many of the volunteers had little to no previous experience banding birds and were very enthusiastic about the opportunity to be involved in banding, especially their first bird in the hand.

#### 4.2. Engaging the Public and Group Visits

During the Spring and Fall Migration Monitoring Programs, group visits to IIBO included the following:

- Darren Irwin (University of British Columbia)
- Nature kids
- Gilmour Elementary
- Nature Kids
- Thor Veen (Quest University)
- Environment & Climate Change Canada – Canadian Wildlife Service

In 2017, more than 200 individuals visited IIBO during group banding demonstrations including visits during the migration monitoring programs. Visiting groups included university/college classes, Nature Kids, and K-12 students. The IIBO station is gaining traction as park visitors can experience close-up interaction with birds and learn new information about the various bird species that use Iona Beach Regional Parks. IIBO also continues to promote the public to participate as citizen scientists to actively contribute to conservation science. In addition, this year WildResearch partnered with the Canadian Wildlife Service to provide a banding demonstration for the winner of the kid's program of the Pacific Flyway Ambassador project. Feedback from leaders of visiting groups in 2017 lend high support for our work at IIBO, and adults and children alike are captivated by their experience of seeing birds in the hand.

*Table 6. The number of volunteers, volunteer hours and operating days during the 2017 IIBO station.*

	<b>Spring</b>	<b>Fall</b>	<b>Winter</b>	<b>Total*</b>
Volunteer hours	845	889	64	1,798
Number of volunteers	44	35	4	N/A
Operating days	40	27	3	70

\*Does not include # of volunteer and volunteer hours during the 2017 summer research project

## 5. CONCLUSIONS

Iona Island Bird Observatory has successfully run several programs for the last eight years (2010-2017) fulfilling both the educational and bird monitoring mandates of the observatory. Documenting the diversity and volume of birds on the Pacific Flyaway in Iona Beach Regional Park is proving to have far reaching impacts from long term monitoring to citizen engagement and scientific collaboration. Our results continue to provide evidence to the importance of the Iona Park Regional Park a significant migratory stop-over and overwintering site in the Lower Mainland.

The 2017 year was a busy one capturing a total of 5,127 birds over 4,068 mist-net hours through the Spring, Fall, and Winter seasons and a capture rate of 1.26 birds per net hour or 1.26 birds per net hour. This is over double the capture rate of the Vancouver Avian Research Center's Colony Farms Banding Station, which was in operation for just over 9,500 net hours with 4,351 birds banded, for a total capture rate of 0.55 birds per net hour in 2017 (Vancouver Avian Research Centre 2017 Annual Report).

Continuation of the IIBO Program should be conducted to identify and characterize any potential declines, or continued patterns of decline. The 2017 IIBO monitoring programs continue to support important conservation goals, such as identifying the various species using Iona Beach Regional Park, evaluating trends in fat contents, and determining arrival dates of migrating species. The 2017 data combined with the results of past IIBO programs acts as a baseline for avian species that use IIBO either as a migration stop-over point, or year-round. Analysis of a subset (2010-2015) of our data can be found in the 6-year cumulative IIBO report (Kissel and Scholefield 2016).

As the effects of climate change and habitat loss intensify, these programs may contribute to management decisions at Iona Beach Regional Park and other natural areas in the Metro Vancouver area in order to maintain avian species diversity. Iona Island Bird Observatory is accomplishing WildResearch's three main goals of research and monitoring of wildlife, environmental education, and community engagement. The current report strengthens the research portion of WildResearch's goals by helping contribute to a shared knowledge base that can inform conservation efforts.



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## APPENDIX A: 2017 CAPTURE DATA

**Table A1.** 2017 Spring Migration Monitoring Program Capture Data<sup>1</sup>

Species	Species Code	New Captures	Number of Recaptures			
			One	Two	Three	Four
American Goldfinch	AMGO	74	11	2	2	
American Robin	AMRO	9	5	1		
Anna's Hummingbird	ANHU	7				
Audubon's Warbler	AUWA	182	4			
Barn Swallow	BARS	1				
Black-capped Chickadee	BCCH	4	1			
Brown-headed Cowbird	BHCO	4	3			
Black-headed Grosbeak	BHGR	7	3			
Black-throated Gray Warbler	BTYW	4				
Bullock's Oriole	BUOR	1				
Cedar Waxwing	CEDW	58				
Common Yellowthroat	COYE	79	7		1	1
Downy Woodpecker	DOWO	2				
Dusky Flycatcher	DUFL	2		1		
European Starling	EUST	6				
Fox Sparrow	FOSP	16	6	1		
Golden-crowned Kinglet	GCKI	27	2			
Golden-crowned Sparrow	GCSP	63	7	1		
White-crowned Sparrow, Gambel's subspecies	GWCS	4				
Hammond's Flycatcher	HAFL	1				
Hermit Thrush	HETH	27	6	2		
House Finch	HOFI	27	2	1	1	
House Sparrow	HOSP	1				
Lincoln's Sparrow	LISP	128	9	1	1	
Marsh Wren	MAWR	15	5			
MacGillivray's Warbler	MGWA	24	1	2		

<sup>1</sup> Species under Provincial permit in bold font

Myrtle Warbler	MYWA	108	8			
Northern Rough-winged Swallow	NRWS	34	2			
Orange-crowned Kinglet	OCKI	1				
Orange-crowned Warbler	OCWA	288	26	9		
Oregon Junco	ORJU	3				
Pacific Wren	PAWR	4	1			
Pine Siskin	PISI	2				
Pacific Slope Flycatcher	PSFL	14	1			
White-crowned Sparrow, Puget Sound subspecies	PSWS	15		1		
Purple Finch	PUFI	2				
Ruby-crowned Kinglet	RCKI	194	34	8	5	1
Rufus Hummingbird	RUHU	63				
Red-winged Blackbird	RWBL	17	7			
Savannah Sparrow	SAVS	26	1			
Song Sparrow	SOSP	41	12	3		
Spotted Towhee	SPTO	15	3	1		
Swainson's Thrush	SWTH	5				
Swamp Sparrow	SWSP	2	2			
Townsend's Warbler	TOWA	1				
Tree Swallow	TRES	37	5	2		
Traill's Flycatcher	TRFL	3	1			
Yellow-rumped Warbler, Unknown subspecies	UYRW	24	3	1		
Violet-Green Swallow	VGSW	42				
Warbling Vireo	WAVI	46	3	1	1	
White-crowned Sparrow	WCSP	5	2			
Western Wood-pewee	WEWP	4				
Willow Flycatcher	WIFL	1				
Wilson's Warbler	WIWA	865	125	13	2	
Yellow Warbler	YEWA	171	6			

**Table A2.** 2017 Fall Migration Monitoring Program Capture Data

Species	Species Code	New Captures	Number of Recaptures				
			One	Two	Three	Four	Five
American Goldfinch	AMGO	8					
American Robin	AMRO	5					
Anna's Hummingbird	ANHU	3					
Audubon's Warbler	AUWA	3					
Black-capped Chickadee	BCCH	12	1	5	5	2	
Bewick's Wren	BEWR	3					
Brown Creeper	BRCR	2		1			
Black-throated Yellow Warbler	BTYW	1					
Cedar Waxwing	CEDW	9	1				
Common Yellowthroat	COYE	80	14	6			
Dark-eyed Junco	DEJU	1					
Downy Woodpecker	DOWO			1			
Dusky Flycatcher	DUFL	1					
Northern Flicker Intergraded	FLIN	1					
Fox Sparrow	FOSP	188	68	9	2	1	1
Golden-crowned Kinglet	GCKI	23					
Golden-crowned Sparrow	GCSP	115	18	1	1		
Hermit Thrush	HETH	37	9	3			
House Finch	HOFI	16	2				
Lincoln's Sparrow	LISP	79	3				
Marsh Wren	MAWR	18	2		1		
MacGillivray's Warbler	MGWA	3		1			
Myrtle Warbler	MYWA	4					
Northern Harrier	NOHA	1					
Orange-crowned Warbler	OCWA	108	8	3			
Oregon Junco	ORJU	14					
Pacific Wren	PAWR	25	4		1		
Pacific Slope Flycatcher	PSWS	28	1				
Purple Finch	PUFI	6	1				
Reb Breasted Nuthatch	RBNU	1					
Ruby-crowned Kinglet	RCKI	78	15	4	2		
Rufous Hummingbird	RUHU	1					
Savannah Sparrow	SAVS	37					

Slate-coloured Junco	SCJU	1					
Song Sparrow	SOSP	167	31	3		1	
Spotted Towhee	SPTO	60	13	4	2		1
Swainson's Thrush	SWTH	2	1				
Traill's Flycatcher	TRFL	29	3				
Varied Thrush	VATH	2					
Warbling Vireo	WAVI	17	4				
White-crowned Sparrow	WCSP	4					
Western Flycatcher	WEFL	4					
Western Tanager	WETA	1					
Worm Eating Warbler	WEWA	1					
Wilson's Warbler	WIWA	32	5	3			
White-throated Sparrow	WTSP	9	5				
Yellow Warbler	YEWA	143	6	2			

**Table A3.** Winter Songbird Monitoring Program 2017 Capture Data

Species	Species Code	New Captures	Number of Recaptures		
			One	Two	Three
American Goldfinch	AMGO	2			
Anna's Hummingbird	ANHU	1			
Black-capped Chickadee	BCCH		1		
Common Yellowthroat	COYE		1		
Fox Sparrow	FOSP	9	19	1	
Golden-crowned Sparrow	GCSP	6	2		
Hermit Thrush	HOFI	15	2		
Northern Shrike	NSHR	1			
Pacific Wren	PAWR		2		
Ruby crowned Kinglet	RCKI	2	3		
Song Sparrow	SOSP	6	3	2	
Spotted Towhee	SPTO	4	10	1	1

## APPENDIX B: INDEX OF SPECIES CODES

Species Code	Species Common Name	Species Code	Species Common Name
AMGO	American Goldfinch	NSHR	Northern Shrike
AMRO	American Robin	OCKI	Orange-crowned Kinglet
ANHU	Anna's Hummingbird	OCWA	Orange-crowned Warbler
AUWA	Audubon's Warbler	ORJU	Oregon Junco
BARS	Barn Swallow	PAWR	Pacific Wren
BCCH	Black-capped Chickadee	PISI	Pine Siskin
BEWR	Bewick's Wren	PSFL	Pacific Slope Flycatcher
BHCO	Brown-headed Cowbird	PSWS	White-crowned Sparrow, Puget Sound subspecies
BHGR	Black-headed Grosbeak	RBNU	Red-breasted Nuthatch
BRCR	Brown Creeper	RCKI	Ruby-crowned Kinglet
BTYW	Black-throated Gray Warbler	RUHU	Rufous Hummingbird
BUOR	Bullock's Oriole	RWBL	Red-winged Blackbird
CEDW	Cedar Waxwing	SAVS	Savannah Sparrow
COYE	Common Yellowthroat	SCJU	Slate-coloured Junco
DEJU	Dark-eyed Junco	SOSP	Song Sparrow
DOWO	Downy Woodpecker	SPTO	Spotted Towhee
DUFL	Dusky Flycatcher	SWSP	Swamp Sparrow

EUST	European Starling	SWTH	Swainson's Thrush
FLIN	Northern Flicker	TOWA	Townsend's Warbler
FOSP	Fox Sparrow	TRES	Tree Swallow
GCKI	Golden-crowned Kinglet	TRFL	Traill's Flycatcher
GCSP	Golden-crowned Sparrow	UYRW	Yellow-rumped Warbler, Unknown subspecies
GWCS	White-crowned Sparrow, Gambel's subspecies	VATH	Varied Thrush
HAFL	Hammond's Flycatcher	VGSW	Violet-Green Swallow
HETH	Hermit Thrush	WAVI	Warbling Vireo
HOFI	House Finch	WCSP	White-crowned Sparrow
HOSP	House Sparrow	WEFL	Western Flycatcher
LISP	Lincoln's Sparrow	WETA	Western Tanager
MAWR	Marsh Wren	WEWA	Worm-eating Warbler
MGWA	MacGillivray's Warbler	WEWP	Western Wood-pewee
MYWA	Myrtle Warbler	WIFL	Willow Flycatcher
NOHA	Northern Harrier	WIWA	Wilson's Warbler
NRWS	Northern Rough-winged Swallow	WTSP	White-throated Sparrow
NSHR	Northern Shrike	YEWA	Yellow Warbler

## APPENDIX C: POINT COUNT SUMMARY FOR SMMP

Species/Family	Count	Species/Family	Count	Species/Family	Count	Species/Family	Count
American Coot	19	Common Merganser	2	Killdeer	10	Ruby-crowned Kinglet	39
American Goldfinch	82	Common Raven	2	Lapland Longspur	1	Rufous Hummingbird	40
American Kestrel	1	Common Yellowthroat	55	Lesser Scaup	3	Savannah Sparrow	17
American Pipit	21	Cooper's Hawk	1	Lincoln's Sparrow	1	scoter sp.	2
American Robin	27	dabbling duck sp.	250	Long-billed Dowitcher	3	Snow Goose	2050
American Wigeon	68	Dark-eyed Junco (Oregon)	1	Mallard	14	Song Sparrow	82
Anna's Hummingbird	2	Double-crested Cormorant	18	Marsh Wren	34	sparrow sp.	1
Bald Eagle	14	duck sp.	400	Mew Gull	7	Spotted Sandpiper	4
Band-tailed Pigeon	6	Dunlin	113	Mountain Bluebird	3	Spotted Towhee	63
Barn Swallow	71	Empidonax sp.	1	Northern Harrier	2	Surf Scoter	16
Black-bellied Plover	6	Eurasian Collared-Dove	2	Northern Pintail	4	swallow sp.	3



blackbird sp.	1	European Starling	92	Northern Rough-winged Swallow	14	Townsend's Warbler	1
Black-capped Chickadee	17	falcon sp.	1	Northern Shoveler	3	Tree Swallow	414
Blue-winged Teal	13	Gadwall	131	Northwestern Crow	30	Violet-green Swallow	229
Bonaparte's Gull	600	Glaucous-winged Gull	2	Orange-crowned Warbler	4	warbler sp. (Parulidae sp.)	2
Brewer's Blackbird	3	Golden-crowned Kinglet	8	Osprey	3	Western Meadowlark	2
Brown-headed Cowbird	7	Golden-crowned Sparrow	59	Pacific Wren	1	Western Sandpiper	35
Bufflehead	20	Great Blue Heron	48	passerine sp.	2	White-crowned Sparrow	17
California Gull	6	Greater Scaup	22	peep sp.	1	Wilson's Warbler	1
Canada Goose	694	Greater Yellowlegs	15	Pelagic Cormorant	1	Yellow Warbler	6
Canvasback	2	Green-winged Teal	311	Pied-billed Grebe	4	Yellow-headed Blackbird	23
Caspian Tern	21	Green-winged Teal (American)	8	Purple Martin	5	Yellow-rumped Warbler	24
Cedar Waxwing	10	gull sp.	251	Red-breasted Merganser	1	Yellow-rumped Warbler (Audubon's)	65
Cinnamon Teal	2	Hooded Merganser	2	Red-throated Loon	1	Yellow-rumped Warbler (Myrtle)	19

Cliff Swallow	19	Horned Grebe	19	Red-winged Blackbird	41		
Common Loon	5	House Finch	20	Ring-necked Duck	4		