Teslin Lake Bird Observatory Annual Report 2021

Yukon
BIRD OBSERVATORIES

Ben Schonewille
Society of Yukon Bird Observatories
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The 2021 operation of the Teslin Lake Bird Observatory was made possible due to support and financial contributions from the following organizations.

Environment Canada

Environnement Canada

Yukon Fish and Wildlife Enhancement Trust

TESLIN RENEWABLE RESOURCES COUNCIL

EDI ENVIRONMENTAL DYNAMICS INC.

Yukon Bird Club

Cover Photo: A Townsend's Warbler banded at TLBO during the fall 2021 season (Photo: Jukka Jantunen).

The Teslin Lake Bird Observatory is operated by the **Society of Yukon Bird Observatories** (SOYBO; PO Box 30056, Whitehorse, YT, Y1A 5M2). SOYBO was established in 2010 to serve as an umbrella society to coordinate bird monitoring activities and associated educational programs at the Yukon Bird Observatories field stations. The objectives of SOYBO are: (1) contribute to the conservation of migratory birds in western North America, (2) to help people learn about the natural history and conservation of Yukon avifauna, and, (3) to work with other societies, organizations and individuals with similar objectives. For further information, visit the SOYBO website at www.yukonbirdobservatories.org

SUMMARY

During 2015, the Yukon Bird Observatories (Teslin Lake and Albert Creek) were granted full membership status to the Canadian Migration Monitoring Network (CMMN). The Yukon Bird Observatories are the northernmost and the only stations located within the core of Canada's Boreal Forest.

The Teslin Lake Bird Observatory completed its fourteenth consecutive year of fall migration monitoring in 2021. The field station operated for a total of 76 days between July 29 and October 20. The observatory has followed the same operating procedures since standardized migration monitoring began during the fall of 2008.

Crews followed standard methods to mist net, handle, band and record information from captured birds. They banded a total of 1,865 birds of 45 species with 3,454 net hours (53.45 birds/100 net hours). The mist netting effort was reduced significantly during early August due to a persistant predation risk in the mist netting area (foxes) which could not be mitigated effectively. Alder Flycatcher, Myrtle Warbler, Yellow Warbler, Boreal Chickadee, and Ruby-crowned Kinglet were the five most common species banded, accounting for over 58% of all individuals banded.

Visual migration and lake counts were conducted to collect monitoring data for bird species not adequately sampled by mist netting (for example diurnal raptors, loons and grebes). Between August 16 and October 20, personnel spent 176.3 hours doing visual counts and observed 28,235 individuals (160 birds per hour) which is well below average compared to previous years.

Noteworthy results from 2021 included:

- The number of birds banded was below the long term average and the capture rate of birds per 100 net hours (53.5) was very near the average of 50 bird per 100 net hours.
- Alder Flycatcher is typically the most frequently banded species at TLBO and this was once again the case during 2021 with a total of 534 individuals banded.
- One new species – Band-tailed Pigeon – was observed and banded for the first time at the observatory during 2021.
- A total of 1,865 raptors and 17,588 waterfowl were observed on the visual migration counts.
- The lake counts tallied a total of 136 bird days of shorebirds (12 species), 520 bird-days of loons (3 species), 247 bird-days of grebes (2 species) and 1,283 bird-days of gulls/terns/jaegers (8 species).
- Visitors and volunteers were minimized at the observatory due to the COVID-19 pandemic.

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1.0 Introduction

This report describes methods and results of work done at the Teslin Lake Bird Observatory from July 29 to October 20, 2021, the fourteenth year of fall operation at this site. No new activities were undertaken at the observatory in 2021.

Previous annual reports and the database of band recoveries can be found on the Society of Yukon Bird Observatories website: www.yukonbirdobservatories.org

1.1 Background

The observatory collects information on birds which is shared through an international bird banding database (Canadian Wildlife Service Bird Banding Office and USGS Bird Banding Laboratory), Society of Yukon Bird Observatories annual station reports, and other publications. During 2015, the Yukon Bird Observatories (Teslin Lake and Albert Creek) were granted full membership status to the Canadian Migration Monitoring Network (CMMN). The CMMN is a nationwide network of 26 member stations from across Canada that collect standardized bird monitoring data and collaborate on research projects. The Yukon Bird Observatories are the northernmost stations and are located within the core of Canada's western Boreal Forest.

Many of the birds banded and observed at Teslin Lake are highly migratory, spending the winter months as far south as Central and South America. In addition to the knowledge gained from band recoveries, the observatory also continues to gather baseline data of birds (and their migration) in the Teslin 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. The observatory serves as a highly valuable research and monitoring project to better understand the distribution of the Yukon's bird species, some 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. In addition to monitoring bird populations, the observatory collects a substantial amount of data on each bird banded. Information such as age, sex, measurements (wing, tail, etc.) and molt timing continue to add to the knowledge base of such information across North America.

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 and monitoring project. Numerous people visit the observatory on an annual basis and the field station has become a valuable training opportunity for individuals interested in learning about ornithological research and monitoring methods.

1.2 Goals of the Teslin Lake Bird Observatory

The goals of the Teslin Lake Bird Observatory are to:

- Gather baseline information on birds and bird migration in the Teslin area.
- Collect data to facilitate the long-term monitoring (*i.e.* trend analysis) of birds in the southern Yukon.
- Conduct and participate in specific studies such as feather collecting for stable isotope analysis and color banding.
- 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 Teslin.

1.3 Objectives of the 2021 Season

The objectives of the 2021 field season at the Teslin Lake Bird Observatory were to:

- Continue the fall monitoring work using previously established protocols,
- Collect an additional year of bird monitoring data to be used for future trend analysis,
- Further refine the techniques to capture and band owls,
- Collect information on the molt timing of adult passerines banded, and,
- Compare 2021 bird migration results to the previous 12 years of similarly collected data.

1.5 Acknowledgements

The 2021 operation of the Teslin Lake Bird Observatory would not have been possible without financial assistance from the following organizations/groups: Environment and Climate Change Canada (Canadian Wildlife Service), Yukon Fish & Wildlife Enhancement Trust Fund, Teslin Renewable Resources Council, and EDI Environmental Dynamics Inc. Yukon Parks provided use of a space in the Teslin Lake campground for an extended period of time to allow our long-term volunteers a place to camp for the duration of the 2021 season. Jukka Jantunen's excellent bird identification skills ensured high quality data collection, particularly during the visual migration counts which are challenging to complete with a high level of accuracy and consistency. Jukka has been the Bander in Charge at TLBO since full scale fall operation of the observatory began during 2008. Ted Murphy-Kelly assisted with field operations and observatory logistics including scheduling of volunteers.

We appreciate the help from the following volunteers without whom the operation of the observatory would not have been possible:

- more than 15 days – Ted Murphy-Kelly, Julie Bauer;
- 5 to 10 days – Cameron Eckert, Pam Sinclair
- Less than 5 days – Sean Munro, Kristina Beckmann, Johanna Maisonneuve, Rebecca Laforge, Meg McKay, Boris Dobrowolsky, Cathy Koot, Lena Ware, Jeff Dyck, Jenny Trapnell, Brenna Kelly, Cora Kelly, Hollie Murphy-Kelly, and Ben Schonewille.

2.0 Methods

2.1 Study Site

Teslin Lake is a 125 km long by 2-5 km wide lake in the south-central Yukon near the border with British Columbia. The standard count area is located near the outlet of 10 Mile Creek at the site known locally as Ten-mile Point; this area is located on the east shore within the north third of the lake. The lake falls in a natural trench that runs to the northwest and serves as a migration route for many bird species coming from breeding areas to the north in Yukon and Alaska. The site falls within the Yukon Southern Lakes Ecoregion (Boreal Cordillera Ecozone)[1].

During the 2005 season, the observatory was located on the shoreline of Nisutlin Bay; however, issues associated with land tenure of the site led to a new site being used since 2006. The current site is located on 10 Mile point approximately 10 km northwest of the community of Teslin. The observatory is located in the riparian zone between Teslin Lake and the Yukon Government Campground (Figure 1). The vegetation within the site is a mixture featuring a transition from bare gravel lakeshore to shrubs and larger deciduous trees. Also within the site is a small wetland area connected to Teslin Lake which has seasonally fluctuating water levels. The area is dominated by willow (*Salix* spp.) and alder (*Alnus* spp.) with some mature white spruce (*Picea glauca*), trembling aspen (*Populus tremuloides*) and balsam poplar (*P. balsamifera*) scattered throughout.

2.2 General Methods

The methods for the operation of the bird observatory follow the Teslin Lake Bird Observatory Field Protocol and Manual[2]. A summary of the field protocol is described in the following sections; however, for a detailed description refer to the publications page of the Society of Yukon Bird Observatories website (www.yukonbirdobservatories.org).

All monitoring activities at the observatory can be separated into standardized and non-standardized methods. 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.

[1] Smith, C.A.S., Meikle, J.C., and Roots, C.F. (editors), 2004. Ecoregions of the Yukon Territory: Biophysical properties of Yukon landscapes. Agriculture and Agri-Food Canada, PARC Technical Bulletin No. 04-01, Summerland, British Columbia, 313 p.

[2] Schonewille, B. 2011. Teslin Lake Bird Observatory (TLBO) Field Protocol (version 2). Society of Yukon Bird Observatories.

Figure 1. Overview of the Teslin Lake Bird Observatory (60.2319 °N, -132.9159 ° W). The numbers and red lines are mist nets, each 12 m long with the exception of net 28 which is 18 m in length. There is a campground bordering the mist netting area on the south side (right hand side of the photo. The red line with the "C" is the non-standard canopy net which was not used during 2021.

For every species observed, estimated totals are calculated for each day of operation using the following categories:

- Band: new birds banded.
- Recaptures: previously banded birds, not included if recaptured on the original day of banding.
- Visual Migrants
    - Migration Watch: birds observed in obvious migration flight, only includes individuals observed during the visual migration counts.
    - Incidental: birds observed in obvious migration flight, only includes individuals observed incidentally (i.e., not during the visual migration counts).
- Observed: birds observed, but not in obvious migration flight; includes incidental observations and the lake counts.

Using the categories outlined above, the Bander-In-Charge estimates the total number of individuals 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). The DET data will provide the basis for future trend analysis of the data collected at the observatory.

During 2021, the operation of the Teslin Lake Bird Observatory was led by the Primary Bander in Charge Jukka Jantunen. Jukka was responsible for overseeing all activities at the observatory including the capture/banding of birds, supervising volunteers, conducting the visual migration watches, recording the daily estimated total data and entering the data. Ted Murphy-Kelly was Co-Station Manager which included station logistics, staffing and filling in for the primary bander. Ben Schonewille was also a Co-Station Manager and looked after data analysis and the preparation of this report. Board members of the Society of Yukon Bird Observatories helped administer the Yukon Bird Observatories.

Site infrastructure is minimal at this site. A narrow trail connects the banding table to the nets and to the station access point via the Yukon Government campground. There is no covered blind from which to watch birds and nets are removed at the end of the season and are stored away from the site. The site is partially below the high-water mark of Teslin Lake and on land owned by the Yukon Government as a component of the campground reserve. To date this level of activity has not required any permitting aside from the federal and territorial permits required for the capture and banding of birds, and a permit from Yukon Parks allowing extended use of a campground site.

2.3 Mist Netting

The primary method of monitoring the movement of birds through the study site is the use of mist nets for the purpose of capturing and banding birds. The observatory operates with 22 standard mist nets and one non-standard mist net (Figure 1). No non-standard nets were used in 2021; note that in previous years a trial canopy net (net ID = C on Figure 1) was used. All nets are 30 mm mesh, 4 panels tall, and 12 m in length, with the exception of net 28 which is 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 favourable. If full effort is not possible, then the number of nets operated is reduced rather than reducing the duration of effort.

2.4 Visual Migration Watch

Visual migration counts are conducted on all days of operation to supplement the banding data. All watches are conducted from the observation site (Figure 1) and involve scanning the sky with binoculars and a spotting scope to observe and count all birds flying past the site. The protocol states that as a minimum, 10 minutes of watch shall be conducted per hour (6 hours) followed by a 1 hour watch at the end of the mist netting period. On many days of operation the visual count effort is substantially more. The visual migration counts aim to monitor diurnal migrating species such as raptors and large waterfowl. Most nocturnal migrants such as most warblers, sparrows and thrush are well-monitored by mist netting. However, for some species which are not adequately covered by mist netting, the visual counts allow for monitoring data to be collected for these species.

Whenever possible, additional information on age, sex and/or color morph is collected for the birds observed during the visual migration watches. Particularly for raptors, the information can supplement the data collected by providing information on the proportion of younger birds.

2.5 Lake Counts

Completed in conjunction with the visual migration counts, a thorough lake count is performed daily from the observation site with a spotting scope to enumerate all birds on or over Teslin Lake which are visible from the predetermined viewing location. These counts target a wide range of species including; loons, grebes, some waterfowl, gulls and some species of shorebirds.

2.6 Incidental Observations

Incidental observations are collected on a continuous basis at the observatory. For example, birds observed on the ground or in the vegetation while conducting mist net checks would be considered incidental observations. Birds in obvious directed migration but not during standard visual migration watches, e.g. flying overhead in flocks or raptors passing overhead, were recorded as 'incidental migrants'.

2.7 Molt Scoring

As supplementary information, in order to assess the timing of molt, we rate the growth of new flight feathers in adult birds that are banded. Although information on the prebasic molt (amount of juvenile plumage remaining) is collected for hatch year birds, a particular emphasis was placed upon collecting wing molt scores for molting adult individuals because this tells us about the timing of the molt as it relates to the timing of migration in various species of adult birds.

Wing molt score is achieved by assigning each individual wing flight feather a score from zero (old feather remaining) to five (new feather fully grown) and adding them together. Birds that have not yet started to molt have a cumulative score of zero whereas individuals which have completed molt would have a score of 75 (based on 9 primary flight feathers) or 80 (10 primary flight feathers).

2.8 Public Engagement

To attract members of the public to the observatory, we put up posters at various common buildings in Teslin including the Nisutlin Trading Post, Yukon Motel, Teslin Tlingit Council Administration Office and Post Office. We also advertised the observation through digital media including the Yukon Bird Observatories blog, Facebook page and website. Interested individuals could also find articles in the the Yukon Government Wildlife viewing program calendars and media advertising.

3.0 Results & Discussion

3.1 Station Operation

The 2021 fall season included a total of 76 field days between July 29 and October 20. Standardized mist netting occurred on 47 days between July 29 and October 6 and non-standard mist netting occurred on 7 days between August 20 and October 5. The mist netting effort prior to August 11 was reduced from the full amount of standardized effort due to the persistent presence of predators (foxes) within the count area during this time which caused an unpreventable risk to the birds if captured in mist nets.

A total of 1,865 birds of 45 species were banded and 138 species were observed (Table 1, Table 2). The all-time total number of birds banded at Teslin Lake Bird Observatory is now 49,697 birds of 96 species and 209 species have been observed (Appendix A). No new species were banded during 2021; however, one new species (Band-tailed Pigeon) was observed at the site on September 18 during a visual migration count.

Table 1. Summary statistics for the 2021 fall season.

Week	Date	Days Operated [1]	Birds Banded				Visual Counts		Total Species Observed
			#	Species	Net Hours	#/100 Net Hours	# of Visual Migrants[2]	Counting Hours	
1	27 Jul – 2 Aug	5	17	9	71.5	23.78	128	0.00	44
2	3 – 9 Aug	7	0	0	0.0	0.00	681	0.00	68
3	10 – 16 Aug	5	203	24	330.0	61.52	114	1.75	62
4	17 – 23 Aug	7	456	24	565.0	80.71	1681	3.83	68
5	24 – 30 Aug	6	190	23	370.0	51.35	2887	14.75	73
6	31 Aug – 6 Sep	6	270	23	445.0	60.67	774	7.25	67
7	7 – 13 Sep	5	300	21	425.0	70.59	1877	11.33	70
8	14 – 20 Sep	7	212	26	581.0	36.49	2553	24.25	89
9	21 – 27 Sep	6	139	16	270.5	51.39	3804	23.67	68
10	28 Sep – 4 Oct	7	59	11	296.5	19.90	4056	29.25	72
11	5 – 11 Oct	6	19	8	99.0	19.19	3911	22.50	65
12	12 – 18 Oct	7	0	0	0.0	0.00	4746	32.50	57
13	19 – 20 Oct	2	0	0	0.0	0.00	1023	5.25	25
ALL	27 Jul – 20 Oct	76	1865	45	3453.5	53.45	28235	176.33	138

[1] Requires a minimum of 3 hours onsite with full estimated totals recorded (does not require mist netting if weather conditions are adverse).

[2] Note this total includes visual migrants counted during the visual counts and incidental visual migrants observed.

Table 2. Birds banded during the 2021 fall season (not including special projects).

Common Name	Scientific Name	# Banded	# Banded / 1000 Net Hrs
Sharp-shinned Hawk	*Accipiter striatus*	11	3.19
Spotted Sandpiper	*Actitus macularius*	1	0.29
Wilson's Snipe	*Gallinago delicata*	2	0.58
Belted Kingfisher	*Ceryle alcyon*	2	0.58
Downy Woodpecker	*Picoides pubescens*	1	0.29
Western Wood-Pewee	*Contopus sordidulus*	2	0.58
Yellow-bellied Flycatcher	*Empidonax flaviventris*	2	0.58
Alder Flycatcher	*Empidonax alnorum*	534	154.63
Least Flycatcher	*Empidonax minimus*	1	0.29
Hammond's Flycatcher	*Empidonax hammondii*	3	0.87
Northern Shrike	*Lanius excubitor*	1	0.29
Warbling Vireo	*Vireo gilvus*	3	0.87
Gray Jay	*Perisoreus canadensis*	2	0.58
Black-capped Chickadee	*Poecile atricapillus*	72	20.85
Mountain Chickadee	*Poecile gambeli*	3	0.87
Boreal Chickadee	*Poecile hudsonicus*	125	36.20
Red-breasted Nuthatch	*Sitta canadensis*	3	0.87
Golden-crowned Kinglet	*Regulus satrapa*	1	0.29
Ruby-crowned Kinglet	*Regulus calendula*	121	35.04
Gray-cheeked Thrush	*Catharus minimus*	1	0.29
Swainson's Thrush	*Catharus ustulatus*	18	5.21
Hermit Thrush	*Catharus guttatus*	2	0.58
American Robin	*Turdus migratorius*	6	1.74
Varied Thrush	*Ixoreus neavius*	1	0.29
American Pipit	*Anthus rubescens*	1	0.29
Cedar Waxwing	*Bombycilla cedrorum*	2	0.58
Northern Waterthrush	*Parkesia noveboracensis*	31	8.98
Orange-crowned Warbler	*Oreothlypis celata*	74	21.43
Common Yellowthroat	*Geothlypis trichas*	55	15.93
American Redstart	*Setophaga ruticilla*	6	1.74
Yellow Warbler	*Setophaga petechia*	154	44.59
Blackpoll Warbler	*Setophaga striata*	23	6.66
Myrtle Warbler	*Setophaga coronata*	160	46.33
Townsend's Warbler	*Setophaga townsendi*	5	1.45
Wilson's Warbler	*Cardellina pusilla*	101	29.25
American Tree Sparrow	*Spizella arborea*	42	12.16
Chipping Sparrow	*Spizella passerina*	1	0.29
Savannah Sparrow	*Passerculus sandwichensis*	14	4.05
Fox Sparrow	*Passerella iliaca*	12	3.47
Lincoln's Sparrow	*Melospiza lincolnii*	19	5.50
White-crowned Sparrow	*Zonotrichia leucophrys*	18	5.21
Slate-colored Junco	*Junco hyemalis*	213	61.68
Rusty Blackbird	*Euphagus carolinus*	12	3.47
White-winged Crossbill	*Carpodacus purpureus*	3	0.87
Common Redpoll	*Acanthis flammea*	1	0.29
TOTAL		1865	1865

Weather conditions largely influence the activities at the observatory. Windy conditions and periods of prolonged precipitation reduce the mist netting effort. Weather conditions also influence the number of birds counted on the visual migration counts due to challenges associated with visibility and the dynamic nature of bird migration in relation to wind patterns. Wind in particular can be problematic at the observatory due to the site being directly adjacent to Teslin Lake and that a number of the nets are located in minimal cover along the shoreline/beach. The 2021 season saw temperatures which were very

similar to previous years overall despite very warm temperatures at the very start of the season; the amount of wind was near average (Table 3, Table 4). The number of days with precipitation (35) was well above average and near the record high of 37 during 2014.

Table 3. Summary of weather conditions during the 2021 fall season.

Weather Parameter	Week							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Average Opening Temperature (°C)	7.0	11.0	10.2	6.1	7.7	6.8	5.0	0.9
Average Closing Temperature (°C)	24.5	17.7	16.8	13.2	14.5	13.7	14.2	8.9
Average Opening Wind (Beaufort scale)	0.0	1.3	1.8	1.3	1.5	1.0	0.6	1.1
Average Closing Wind (Beaufort scale)	0.8	2.4	2.4	3.0	2.5	1.7	1.8	2.0
Days with Rain (during count period)	0	2	4	3	2	3	4	3
Days with Snow (during count period)	0	0	0	0	0	0	0	0

Weather Parameter	Week					Whole Season
	9	**10**	**11**	**12**	**13**	
Average Opening Temperature (°C)	2.3	0.4	-1.7	-2.6	-2.0	**4.1**
Average Closing Temperature (°C)	6.0	5.4	4.7	3.4	2.5	**10.9**
Average Opening Wind (Beaufort scale)	1.7	2.0	1.7	2.0	2.0	**1.4**
Average Closing Wind (Beaufort scale)	3.5	2.4	2.2	2.9	3.0	**2.3**
Days with Rain (during count period)	3	1	1	2	0	**28**
Days with Snow (during count period)	1	3	2	1	0	**7**

Table 4. Comparison of weather conditions during 2021 as compared to previous years.

Weather Parameter	Annual Average										2011 – 2020 Average
	2012	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	
Average Opening Temperature (°C)	2.6	6.0	4.7	4.4	4.8	4.7	3.5	4.1	3.5	4.1	4.3
Average Closing Temperature (°C)	10.7	14.4	11.8	10.2	12.1	12.6	14.3	12.9	11.1	10.9	12.2
Average Opening Wind (Beaufort scale)	1.7	1.5	1.4	1.3	1.6	1.6	1.4	1.4	1.3	1.4	1.5
Average Closing Wind (Beaufort scale)	2.9	2.7	2.3	2.5	2.4	2.3	2.0	1.9	1.9	2.3	2.3
Days with Rain (during count period)	17	14	32	19	16	21	14	13	30	28	19.6
Days with Snow (during count period)	6	0	5	2	1	4	1	2	2	7	2.6

3.2 Patterns in Captures

The peak periods for banding occurred between August 16 to 27 and September 4 to 12 (Figure 2). The highest single day banding totals included 122 birds on August 16 and 108 birds on September 12. A number of species were banded on August 16; however, the majority of birds banded on this day (99) were Alder Flycatcher. Note that the lack of birds banded in early August was the result of persistent predators (foxes) within the count area which resulted in no mist netting effort between July 31 and August 10.

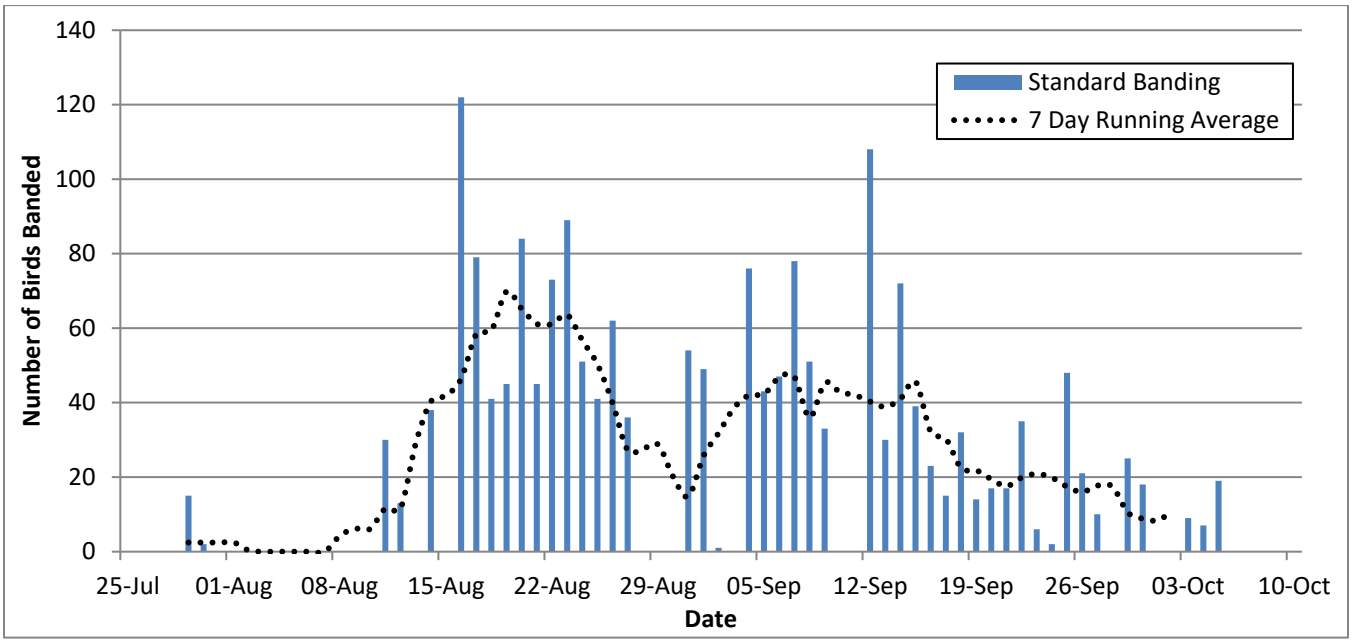

Figure 2. Summary of birds banded per day during the fall of 2021.

The number of birds banded during 2021 (1,865) was slightly below the long-term average of 3,155; however, the 2021 total is not directly comparable due to the limited mist netting effort through early August. When birds per net hour are taken into consideration, the 2021 value of 54.3 birds per 100 net hours was slightly above the long-term average of 48.4 (Figure 3).

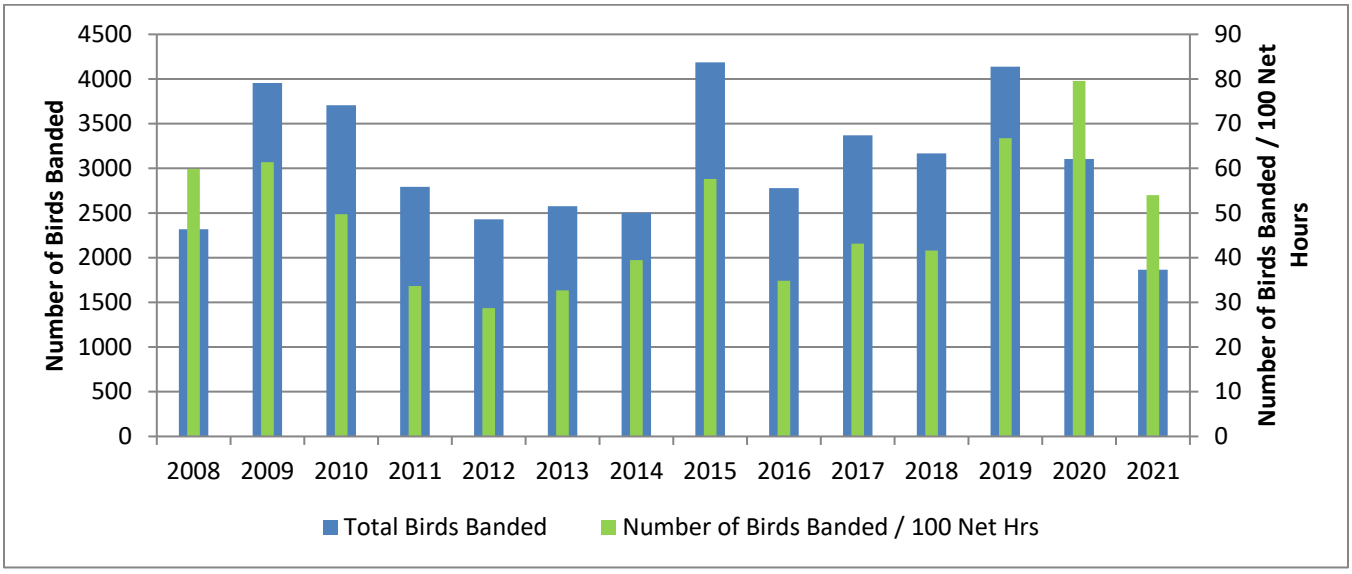

Figure 3. Summary of birds banded during the fall from 2008 to 2021.

3.3 Visual Migration Counts

The visual migration counts provide a method of estimating relative numbers of individuals in migration that would not be caught in mist nets. The counts are especially useful in observing raptors in migration and also serve as a method for monitoring waterbirds, waterfowl and some species of passerines. Note that birds seen during the migration counts which are not in active migration flight are not included in this section. Birds "in active migration flight" typically show a directed flight over the count area and do not appear to linger within the count area.

During the fall 2021 season, visual migration counts (standard & nonstandard) were conducted for 176.3 hours (Figure 4). The amount of counting effort during 2021 was slightly below the 2008 to 220 average of 240 hours of observation effort per year.

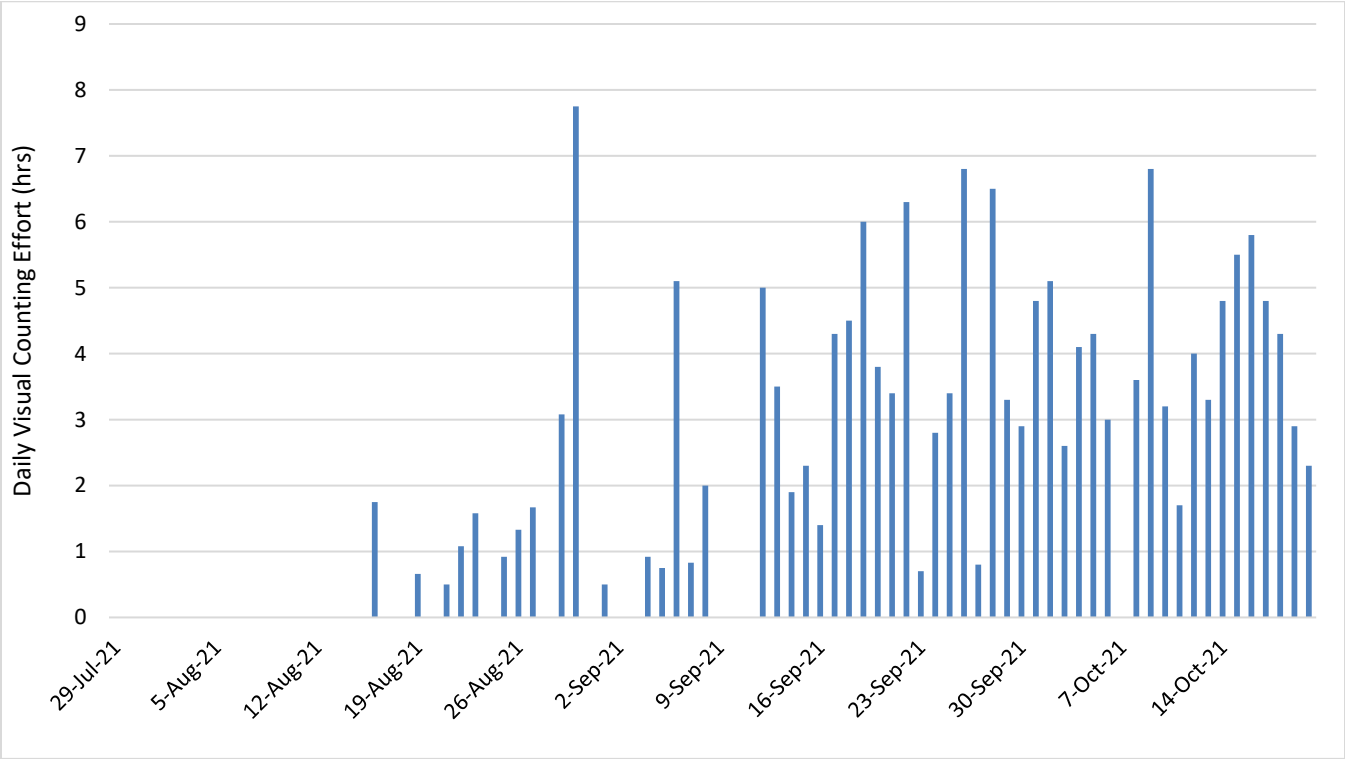

Figure 4. Visual counting effort, in hours each day, over the duration of the 2021 season.

A total of 28,235 birds were observed during the 2021 visual migration counts with waterfowl accounting for the largest proportion of the birds observed (Table 5). Compared to previous years an in similarity to 2020, the number of birds observed during 2021 was relatively low for all species groups, particularly the waterbirds/shorebirds and passerines.

Table 5. Summary of birds observed on the visual migration counts from 2009 to 2021.

Year	Total Birds Observed					TOTAL BIRDS OBSERVED / HR	Visual Counting Effort (hrs)
	Waterbirds & shorebirds	Waterfowl	Raptors	Passerines	ALL SPECIES		
2009	4,927	8,219	1,612	11,000	25,758	201	128.1
2010	3,491	22,258	1,710	16,277	43,736	188	232.4
2011	1,072	31,548	3,680	37,951	74,251	218	340.6
2012	1,583	35,044	1,977	21,408	60,012	169	354.8
2013	2,166	7,852	2,466	28,839	41,323	147	280.9
2014	721	28,556	2,300	23,397	54,974	197	279.0
2015	3,878	22,560	4,211	11,797	42,446	218	194.6
2016	1,043	14,885	1,946	20,182	38,056	204	186.7
2017	436	9,497	980	13,626	24,539	87	235.6
2018	1,103	11,689	1,268	2,386	16,443	138	119.5
2019	1,690	30,544	2,095	15,705	50,034	248	201.6
2020	767	21,238	1,253	9,731	32,989	74	448.2
2021	593	17,588	1,865	8,189	28,235	160	176.3
2009-2020 Average	1,906	20,324	2,125	17,692	42,047	174	250

3.4 Lake Counts

The lake counts provide monitoring data for various species of shorebirds, loons, grebes, waterfowl, and gulls/terns/ jaegers. Twelve shorebird species were observed during the lake counts with all species observed in relatively low numbers with the exception of Spotted Sandpiper. Although the total number of individuals observed was relatively low, the species diversity was modest.

The majority of loons and grebes counted at the observatory are observed on the lake counts and this was once again the case during 2021 with a total of 520 loons and 247 grebes (Table 6). Geese and swans were observed in very low numbers during the lake counts; these species are typically observed flying over the site only (i.e. are visual migrants). However, for some duck species (scoters and mergansers), the lake counts record data to supplement the visual migration counts (Table 6). Only small numbers of dabbling and diving ducks are seen mostly due to scarcity of suitable stopover and feeding habitats near the observatory. As a group, gulls, terns and jaegers are well-monitored through the use of the lake counts; species of this group are the most commonly recorded birds using this method. A total of 8 species of gulls/terns/jaegers were observed on the 2021 lake counts.

Table 6. Summary of shorebirds (left), waterbirds (middle) and waterfowl (right) observed on the lake counts during 2021. One bird day represents one individual on one day; two bird days could represent single birds on two days or two birds on the same day.

Species	Total # of Bird Days	Species	Total # of Bird Days	Species	Total # of Bird Days
Semi-palmated Plover	14	Pacific Loon	78	Greater White-fronted Goose	18
American Golden-Plover	1	Common Loon	313	Canada Goose	108
Killdeer	2	Red-throated Loon	127	*Unidentified Goose*	65
Sanderling	3	*Unidentified Loon*	2	Trumpeter Swan	29
Least Sandpiper	16	Red-necked Grebe	221	Tundra Swan	21
Semipalmaterd Sandpiper	2	Horned Grebe	26	*Unidentified Swan*	25
Long-billed Dowitcher	1	Mew Gull	170	Mallard	54
Red-necked Phalarope	9	Herring Gull	596	Green-winged Teal	8
Spotted Sandpiper	68	Thayer's Gull	319	Gadwall	1
Solitary Sandpiper	6	Glaucous Gull	2	Northern Shoveler	1
Lesser Yellowlegs	2	Sabine's Gull	9	American Wigeon	2
Wilson's Snipe	12	Bonaparte's Gull	40	Surf Scoter	126
		Arctic Tern	66	White-winged Scoter	24
		Parasitic Jaeger	3	*Unidentified Scoter*	7
		Unidentified Gull	78	Lesser Scaup	39
		Sandhill Crane	10	Ring-necked Duck	14
				Common Goldeneye	9
				Barrow's Goldeneye	8
				Unidentified Goldeneye	2
				Harlequin Duck	1
				Common Merganser	2285
				Red-breasted Merganser	581
				Unidentified Merganser	35
TOTAL	**136**	**TOTAL**	**2,060**	**TOTAL**	**3,463**

3.5 Visitors and Volunteers

Visitors and volunteers are normally a large component of TLBO's operation; however, both were reduced during 2021 due to the COVID-19 pandemic. Despite this, we were still able to attract local volunteers to assist with the observatory's operation. A total of 369 volunteer hours were tallied during the fall of 2021 and were represented primarily with Whitehorse based volunteers. While this amount of volunteer hours is the lowest since 2011, this is directly related to the inability to attract a long-term volunteer from outside of the Yukon.

4.0 Conclusion

The results from the operation of the Teslin Lake Bird Observatory in 2021 have continued to add to the knowledge of numerous aspects of bird biology in the Yukon, including: species distribution, migration timing and productivity. The location of the study site has proven to be effective for monitoring songbird migration. The primary reason for this is the close proximity of the site to Teslin Lake. As the lake is a very large body of water which migrating landbirds are hesitant to cross, many birds concentrate along the lakeshore and pass directly through and over the study site. On numerous occasions, flocks of migrating birds have been observed moving along the lakeshore and thus have yielded some very impressive banding and observation totals at the observatory.

Following fourteen years of fall migration monitoring at the observatory, the ability to monitor songbirds has been well demonstrated by the large numbers of migrants observed and banded on an annual basis. The results gathered this season also confirm the previous assumption that few birds stopover at the study site for extended periods of time. The majority of birds simply pass through the site while in migration and this is supported by the low proportion of band repeats within each season.

The visual migration and lake counts increase the number of bird species which may be monitored at the observatory and are now a key component of the observatory's activities. Together they serve to collect monitoring data for species not banded (or banded only in low numbers) including: waterfowl, loons/grebes, gulls/terns, raptors and some species of passerines, particularly American Robin, Varied Thrush, American Pipit, Rusty Blackbird, Common Redpoll and Pine Siskin. The raptors are a primary focus of these counts as these species are readily observed and identified from a distance. The ability to collect data on ages and color morphs of these species make this data even more valuable.

Over the long term, the data collected at the observatory will be used to refine species trends first prepared during 2021 to determine the status on bird populations. Given the location of the observatory, the birds counted at the site are known to originate in the Yukon and Alaska. Species trend data from this relatively small catchment area will be useful when used in combination with more southerly bird observatories which monitor birds from a much larger catchment area.

Due to the COVID-19 pandemic, the observatory did not advertise to the public. However, throughout growing network of volunteers, it was possible to adequately schedule volunteers to assist with day to day operations of the observatory. It is hoped that in future years, we will again be able to be more open and continue to attract visitors to the site.

Appendix A – Species Checklist

Table A1. Birds banded and observed (✓) at Teslin Lake Bird Observatory from 2008 to 2016. Note that observations were not collected during the fall of 2005, 2006 and 2007; observatory was located at a different location on Nisutlin Bay during 2005.

SPECIES	2005		2006		2007		2008		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	SPRING TOTAL	FALL TOTAL	ALL TIME TOTAL
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall			
Bean Goose										✓												-	-	-
Greater White-fronted Goose	✓		✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Snow Goose					✓		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Cackling Goose												✓							✓		✓	-	-	-
Canada Goose	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Trumpeter Swan	✓		✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Tundra Swan			✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Bewick's Tundra Swan										✓	✓											-	-	-
Gadwall	✓						✓								✓						✓	-	-	-
American Wigeon	✓		✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Mallard	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Blue-winged Teal							✓															-	-	-
Northern Shoveler	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Northern Pintail	✓				✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
American Green-winged Teal	✓		✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	-	-	-
Canvasback								✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Redhead									✓	✓				✓	✓						✓	-	-	-
Ring-necked Duck	✓						✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Greater Scaup								✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Lesser Scaup							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Harlequin Duck							✓	✓		✓	✓	✓	✓	✓		✓			✓	✓	✓	-	-	-
Surf Scoter	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
White-winged Scoter	✓							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Long-tailed Duck							✓			✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	-	-	-
Bufflehead	✓				✓					✓	✓	✓	✓	✓		✓	✓	✓	✓	✓		-	-	-
Common Goldeneye	✓		✓		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Barrow's Goldeneye							✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓		✓	-	-	-
Hooded Merganser									✓	✓		✓				✓						-	-	-
Common Merganser	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Red-breasted Merganser	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Ruffed Grouse	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Spruce Grouse	✓						✓		✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	-	-	-
Red-throated Loon	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Pacific Loon								✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Common Loon	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Yellow-billed Loon										✓	✓	✓		✓		✓	✓					-	-	-
Horned Grebe								✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Red-necked Grebe	✓		✓					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-

SPECIES	2005		2006		2007		2008		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	SPRING TOTAL	FALL TOTAL	ALL TIME TOTAL
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall			
Western Grebe											✓						✓					-	-	-
Double-crested Cormorant							✓															-	-	-
Great Blue Heron																✓						-	-	-
Turkey Vulture														✓								-	-	-
Osprey	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Golden Eagle							✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	-	-	-
Northern Harrier	✓		✓		✓		1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1	✓	✓	1	1	2
Sharp Shinned hawk	✓		✓		2		1	10	23	14	7	13	6	14	25	10	12	10	7	3	11	3	165	168
Northern Goshawk							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Bald Eagle	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Swainson's Hawk							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Red-tailed Hawk			✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Rough-legged Hawk							✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Sora																			✓					
Sandhill Crane								✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Black-bellied Plover											✓			✓								-	-	-
American Golden-Plover							✓			✓	✓		✓		✓	✓	✓				✓	-	-	-
Semipalmated Plover	✓				✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Killdeer	✓		✓		✓		✓			✓	✓					✓				✓	✓	-	-	-
Upland Sandpiper													✓		✓					✓		-	-	-
Black Turnstone												✓			✓							-	-	-
Stilt Sandpiper													✓									-	-	-
Sanderling								✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Baird's Sandpiper							✓	✓	✓		✓		✓		✓		✓		✓			-	-	-
Least Sandpiper					✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	1	✓	✓	✓	✓	✓	-	1	1
Pectoral Sandpiper					✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Semipalmated Sandpiper								✓	✓	✓	✓	✓	✓		✓	✓		✓			✓	-	-	-
Western Sandpiper											✓					✓	✓					-	-	-
Surfbird																		✓				-	-	-
Short-billed Dowitcher							✓								✓							-	-	-
Long-billed Dowitcher								✓	✓	✓	✓	✓		✓	✓	✓	✓				✓	-	-	-
Wilson's Snipe	✓		✓		✓		1	1	1	✓	✓	✓	✓	1	✓	1	✓	2	✓	✓	2	1	8	9
Red-necked Phalarope									✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Red Phalarope																✓				✓		-	-	-
Spotted Sandpiper	1		2		1		1	✓	✓	1	2	✓	1	✓	✓	1	✓	✓	1	✓	1	5	7	12
Solitary Sandpiper	✓		✓	2	✓		✓	2	5	1	3	3	2	1	3	✓	✓	✓	1	✓	✓	-	23	23
Wandering Tattler										✓												-	-	-
Greater Yellowlegs			✓		✓		✓		✓		✓		✓					✓				-	-	-
Lesser Yellowlegs	✓		✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	-	-	-

SPECIES	2005		2006		2007		2008		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	SPRING TOTAL	FALL TOTAL	ALL TIME TOTAL
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall			
Parasitic Jaeger								✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Long-tailed Jaeger													✓									-	-	-
Black-legged Kittiwake										✓				✓								-	-	-
Sabine's Gull								✓	✓	✓	✓	✓		✓		✓	✓		✓	✓	✓	-	-	-
Bonaparte's Gull	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Little Gull										✓	✓											-	-	-
Mew Gull	✓		✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Ring-billed Gull																	✓					-	-	-
California Gull										✓		✓					✓					-	-	-
Herring Gull	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Thayer's Gull								✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Iceland Gull																✓			✓			-	-	-
Glaucous-winged Gull										✓	✓											-	-	-
Glaucous Gull								✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Arctic Tern	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Band-tailed Pigeon																					✓	-	-	-
Great Horned Owl								✓	✓	✓	✓			✓	✓	✓	✓		✓	✓	✓	-	-	-
Northern Hawk Owl									✓	✓	✓	✓	✓	✓		✓		✓	✓		✓	-	-	-
Short-eared Owl			✓							✓	✓	✓							✓			-	-	-
Boreal Owl											4			40	✓	5						-	49	49
Northern Saw-whet Owl														2								-	2	2
Common Nighthawk								✓	✓	✓	✓		✓	✓	✓		✓		✓	✓	✓	-	-	-
Pacific Swift										✓												-	-	-
Rufous Hummingbird					✓											✓	✓	✓			✓	-	-	-
Belted Kingfisher	✓		✓	8	✓		✓	8	6	5	6	6	2	9	6	4	3	3	1	6	2	-	75	75
Yellow-bellied Sapsucker	2		2		2		1		✓		3	1	1							✓		7	5	12
Downy Woodpecker	✓		✓					2	1	3	7			1	1	✓	✓	4	2	1	1	4	27	31
Hairy Woodpecker	2		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2	✓	✓	2	2	4
Three-toed Woodpecker	✓							✓	✓	✓	✓	✓	1	✓	✓	✓	1	1	✓	✓	✓	-	3	3
Black-backed Woodpecker								✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	-	-	-
Northern Flicker	1		✓		1		✓	✓	✓	1	1	✓	3	✓	✓	3	1	✓	✓	✓	✓	2	9	11
Pileated Woodpecker	✓																					-	-	-
American Kestrel	✓						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Merlin					✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2	2	3	✓	✓	-	7	7
Gyrfalcon									✓	✓		✓		✓	✓			✓	✓	✓	✓	-	-	-
Peregrine Falcon					✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Olive-sided Flycatcher	✓		11		✓		6		✓	✓	1	✓	✓	✓	2	✓	✓	✓			✓	17	3	20
Western Wood-pewee	3		2		2		✓	3	6	5	10	3	4	4	4	✓	1	6	4	✓	2	7	52	59
Yellow-bellied Flycatcher	2	2	1		1			9	8	11	7	9	11	3	11	16	14	10	12	7	2	4	132	136

SPECIES	2005		2006		2007		2008		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	SPRING TOTAL	FALL TOTAL	ALL TIME TOTAL
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall			
Alder Flycatcher	17	9	41	18	10	5	9	811	631	620	637	827	770	506	1058	498	548	358	918	1143	534	77	10249	10326
Least Flycatcher	3		4		3		2	2	1	3	10	3	6	2	4	7	2	2	✓	1	1	12	44	56
Hammond's Flycatcher	7		5		11		18	6	12	17	28	7	12	8	21	19	10	20	30	16	3	41	209	250
Dusky Flycatcher	2				2			1	6	3	6	3	3	4	2		4	6	3	3		4	44	48
Western Flycatcher												1				1						-	2	2
Eastern Phoebe			1																			1	-	1
Say's Phoebe			2		2		1	1	1	1	✓	✓	✓	✓	2	2	✓	✓	✓	1	✓	5	8	13
Western Kingbird																	✓					-	-	-
Northern Shrike	✓								✓	1	1	1	1	1	✓	1	2	1	1	1	1	-	12	12
Warbling Vireo	13		1	4	✓		1	9	10	19	17	15	48	12	10	24	19	17	10	15	3	15	249	264
Philadelphia Vireo																		1	1			-	2	2
Canada Jay	5		✓		1		✓		5	4	✓	✓	✓	1	1	✓	✓	4	4	1	2	6	22	28
Steller's Jay											✓									✓	✓	-	-	-
Black-billed Magpie					✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	4	1	✓	✓	✓	-	5	5
Clark's Nutcracker																	✓							
Common Raven	✓		✓		✓		✓	✓	1	1	✓	✓	✓	✓	1	✓	✓	✓	✓	✓	✓	-	3	3
Horned Lark			3		✓		✓		✓	✓							✓	✓	✓			3	-	3
Northern Rough-winged Swallow																✓								
Tree Swallow	5		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			5	-	5
Violet-green Swallow	✓		✓		✓		✓	✓		✓	✓	✓			✓	✓	✓	✓	✓		✓	-	-	-
Bank Swallow	✓		✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Barn Swallow	✓		✓		✓			✓	1	✓	✓	✓	✓	✓		✓	✓	✓	✓		✓	-	1	1
Cliff Swallow	✓		✓		✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Black-capped Chickadee	✓	4	4	3	2		2	57	26	22	92	65	31	16	31	24	95	55	110	19	72	8	777	785
Mountain Chickadee							2	15	11		2	1	✓		4		1	2	1	✓	3	2	40	42
Chestnut-backed Chickadee								1			✓											-	1	1
Boreal Chickadee	2		3		2		8	138	831	✓	233	142	23	3	131	40	473	234	17	25	125	15	2650	2665
Hybrid Chickadee			1					1														1	1	2
Red-breasted Nuthatch	✓				✓		1	3	2	2	5	12	6	3	9	3	4	4	5	3	3	1	64	65
Brown Creeper											✓											-	-	-
Winter Wren	1										✓			1							✓	1	1	2
American Dipper														✓								-	-	-
Golden-crowned Kinglet		1					✓		10	2	1	3	1		2	3	4	7	5	4	1	-	44	44
Ruby-crowned Kinglet	25	7	51	3	27		72	29	175	109	86	134	125	69	284	89	114	150	192	54	121	175	1891	2066
Mountain Bluebird	✓				✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-
Townsend's Solitaire								✓	1	✓	1	1	✓	✓	✓	2	✓	✓	✓	✓	✓	-	5	5
Gray-cheeked Thrush	4	2	2		5		1	1	2	8	2	4	2	10	11	8	4	30	9	4	1	12	98	110
Swainson's Thrush	99	7	39	10	48		21	19	49	53	85	41	55	49	68	82	26	102	122	58	18	207	844	1051
Hermit Thrush	1		1		✓		1	1	7	12	12	3	2	1	8	7	2	14	8		2	3	79	83

SPECIES	2005		2006		2007		2008		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	SPRING TOTAL	FALL TOTAL	ALL TIME TOTAL
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall			
American Robin	27	1	36	5	17		4	✓	27	9	11	✓	4	9	3	✓	1	16	25	8	6	84	256	209
Gray Catbird																				1			1	1
Varied Thrush	✓		1		2		✓	3	12	5	2	2	5	3	2	✓	5	5	2	3	1	3	50	53
European Starling							✓															-	-	-
American Pipit	✓		2		✓		1	1	3	✓	2	✓	2	✓	6	2	✓	✓	✓	2	1	3	19	22
Bohemian Waxwing	✓		40		✓		23	✓	✓	✓	1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	63	1	64
Cedar Waxwing									✓	2			8	✓			✓			✓	2	-	12	12
Lapland Longspur	✓		✓		✓		5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	1	✓	✓	✓	5	1	6
Smith's Longspur									✓				✓				✓					-	-	-
Snow Bunting										✓	✓	✓	✓	✓			✓	✓	✓	✓		-	-	-
Rustic Bunting																			✓			-	-	-
Northern Waterthrush	4	1	14	10	11		4	46	53	54	42	47	46	48	53	34	34	47	58	45	31	33	696	727
Black-and-white Warbler															1				1			-	2	2
Tennessee Warbler	4		4		6		2		9	40	4	1	1	1	8	13	17	16	8	1		16	127	143
Orange-crowned Warbler	16	6	26	1	47		61	101	180	271	57	88	124	149	331	364	176	235	243	55	74	150	2690	2840
Nashville Warbler								1				1										-	2	2
MacGillivary's Warbler	1		1					1	3	2		1	1									2	8	10
Common Yellowthroat	1		17	4	11	6	21	66	113	70	72	45	65	82	89	57	59	81	146	74	55	50	1165	1215
American Redstart			6	4	1			10	43	30	39	21	33	25	47	15	23	28	22	19	6	7	393	400
Cape May Warbler							1					1										1	1	2
Magnolia Warbler	1							1			✓	1	1				1					1	4	5
Blackburnian Warbler															1							-	1	1
Yellow Warbler	10	6	50	19	37	3	31	486	325	471	310	225	333	504	556	449	163	266	655	404	154	128	5595	5723
Blackpoll Warbler	3	2	21	4	10		5	47	107	194	58	87	87	61	99	134	71	95	96	35	23	39	1295	1333
Yellow-rumped Warbler							1	1														1	1	2
Yellow-rumped Warbler (Myrtle)	60	3	63	5	29		78	49	284	673	142	195	163	178	311	286	654	478	379	138	160	230	4576	4806
Yellow-rumped Warbler (Audubon's)										✓	1											-	1	1
Townsend's Warbler			✓				1	✓	8	10	6	6	7	10	2	2	16	10	8	9	5	1	99	100
Wilson's Warbler	116	8	54	5	63		151	113	161	177	133	134	122	164	386	172	68	164	245	81	101	384	2374	2758
American-tree Sparrow	220		13	1	72		41	19	54	21	77	17	19	22	137	20	27	88	45	5	42	346	682	1028
Chipping Sparrow	28		4	1	6		3	6	24	18	28	17	20	15	29	31	38	18	50	34	1	41	331	372
Brewer's Sparrow				1					1		2						1	3	1			-	9	9
Fox Sparrow	106		3		17		26	11	28	28	17	6	7	17	42	10	13	99	15	3	12	152	308	460
Dark-eyed Junco					9		31	11	✓	✓	✓	✓			2							40	13	53
Dark-eyed Junco (Slate-colored)	165	12	139	5	135		224	182	582	420	331	116	341	140	209	229	443	348	384	139	213	663	4444	5054
White-crowned Sparrow	86	3	13		579		311	1	33	36	34	22	16	15	23	15	20	31	24	15	18	989	338	1325
Golden-crowned Sparrow	1				16		9						1	1	2			✓		1		26	5	31
White-throated Sparrow			✓		1													1				1	1	2
Savannah Sparrow	11	2	2	2	24		10	14	18	18	23	25	18	17	55	17	12	25	48	16	14	47	324	371

SPECIES	2005		2006		2007		2008		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	SPRING TOTAL	FALL TOTAL	ALL TIME TOTAL
	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall	Fall			
Song Sparrow										1						1			1			-	3	3
Lincoln's Sparrow	9	1	6		39		21	5	16	15	27	9	9	9	65	13	14	54	39	11	19	75	360	435
Swamp Sparrow										1									2			-	3	3
Western Tanager			1						1		✓	✓						✓				1	1	2
Red-winged Blackbird	✓		1		1		✓		✓		✓	✓	✓			✓		✓	✓	✓		2	-	2
Rusty Blackbird	19		3		2	1	✓	11	30	20	16	9	14	10	18	6	14	3	17	1	12	24	182	206
Brown-headed Cowbird	1		✓		✓		✓			✓	1		✓	2	1			✓				1	4	5
Pine Grosbeak			2					✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	2	-	2
Purple Finch	27		3		6		1	✓	✓	10	1	2	1	3	✓	✓	✓	3	1	2	✓	37	23	60
Red Crossbill	3						✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	3	-	3
White-winged Crossbill			5					2	2	100	1	2	5	2	✓	46	✓	✓	62	✓	3	5	225	230
Common Redpoll	✓		107		1		22	✓	6	1	75	47	✓	1	8	3	2	4	3	1	1	130	152	282
Hoary Redpoll					3						2			✓					1			3	3	6
Pine Siskin	28		1				✓	1	1	91	10	3	8	303	1	3	151	2	87	4	✓	29	665	692
Evening Grosbeak														✓								-	-	-
TOTAL SPECIES BANDED	**43**	**18**	**48**	**21**	**43**	**4**	**45**	**48**	**53**	**52**	**57**	**51**	**51**	**48**	**51**	**51**	**47**	**52**	**55**	**44**	**45**	**70**	**90**	**96**
TOTAL BIRDS BANDED	**1142**	**77**	**814**	**115**	**1267**	**15**	**1238**	**2319**	**3956**	**3706**	**2793**	**2429**	**2,577**	**2,510**	**4,186**	**2,780**	**3,369**	**3,167**	**4,138**	**2,471**	**1,865**	**4,461**	**45,220**	**49,697**

Appendix B – Daily Species Total Summary

Species	First Date	ALL OBS		Last Date	HIGH COUNT	
		# of Days	Bird Days		#	Date
Greater White-fronted Goose	7-Aug	16	3696	18-Oct	1536	29-Aug
Snow Goose	18-Sep	14	1472	09-Oct	362	28-Sep
Canada Goose	8-Sep	10	647	22-Sep	258	12-Sep
Cackling Goose	20-Sep	1	3	-	3	20-Sep
Unidentified Goose	6-Sep	4	296	22-Sep	151	22-Sep
Trumpeter Swan	20-Sep	23	1758	20-Oct	552	16-Oct
Tundra Swan	18-Sep	28	6180	20-Oct	1140	04-Oct
Unidentified Swan	19-Sep	25	1630	20-Oct	609	9-Aug
American Wigeon	4-Aug	18	204	14-Oct	46	20-Sep
Mallard	29-Jul	48	583	18-Oct	96	09-Oct
Gadwall	5-Aug	1	1	-	1	05-Aug
Northern Shoveler	6-Aug	10	66	05-Oct	22	13-Aug
Northern Pintail	5-Aug	20	366	09-Oct	65	29-Aug
Canvasback	12-Sep	6	140	18-Oct	53	18-Sep
Ring-necked Duck	20-Sep	5	40	13-Oct	21	20-Sep
Greater Scaup	22-Sep	10	69	18-Oct	15	13-Oct
Lesser Scaup	2-Aug	26	417	19-Oct	119	25-Sep
Unidentified Scaup	29-Sep	4	43	12-Sep	25	11-Oct
Unidentified Scaup	29-Sep	4	43	12-Sep	25	11-Oct
Surf Scoter	1-Aug	25	221	17-Oct	60	23-Sep
White-winged Scoter	17-Sep	5	70	05-Oct	63	05-Oct
Unidentified Scoter	12-Sep	1	7	-	7	12-Sep
Harlequin Duck	16-Sep	1	1	-	1	16-Sep
Long-tailed Duck	11-Oct	3	11	19-Oct	5	12/19-Oct
Barrow's Goldeneye	30-Aug	5	13	06-Oct	3	many days
Common Goldeneye	30-Sep	10	46	19-Oct	11	12-Oct
Unidentified Goldeneye	25-Aug	5	15	17-Oct	5	15-Jan
Common Merganser	4-Aug	51	2299	20-Oct	255	16-Sep
Red-breasted Merganser	29-Jul	49	604	15-Oct	60	24-Sep

Species	First Date	ALL OBS		Last Date	HIGH COUNT	
		# of Days	Bird Days		#	Date
Unidentified Merganser	3-Aug	4	37	19-Oct	23	19-Oct
Unidentified Duck	5-Aug	3	44	13-Oct	30	5-Aug
Ruffed Grouse	5-Aug	23	34	15-Oct	5	19-Sep
Spruce Grouse	14-Oct	1	1	-	1	14-Oct
Red-throated Loon	30-Jul	46	127	08-Oct	13	08-Sep
Pacific Loon	30-Jul	32	89	09-Oct	9	13-Sep
Common Loon	29-Jul	58	314	06-Oct	26	25-Sep
Unidentified Loon	29-Aug	8	21	17-Oct	9	22-Sep
Horned Grebe	31-Aug	11	26	18-Oct	6	05-Oct
Red-necked Grebe	29-Jul	57	223	17-Oct	15	26/31- Aug
Osprey	5-Aug	22	58	08-Oct	7	17-Sep
Golden Eagle	15-Sep	19	154	18-Oct	36	09-Oct
Bald Eagle	29-Jul	65	144	19-Oct	7	22-Sep
Northern Harrier	5-Aug	47	355	18-Oct	75	22-Sep
Sharp-shinned Hawk	7-Aug	47	399	17-Oct	70	26-Sep
Northern Goshawk	6-Sep	17	30	20-Oct	4	04-Oct
Swainson's Hawk	16-Aug	8	84	17-Sep	76	30-Aug
Red-tailed Hawk	16-Aug	8	13	18-Oct	2	many days
Red-tailed Hawk (Harlan's)	3-Aug	34	512	19-Oct	103	19-Sep
Rough-legged Hawk	22-Sep	21	126	19-Oct	32	09-Oct
Unidentified Buteo	30-Aug	6	23	30-Sep	14	30-Sep
Sandhill Crane	29-Aug	9	202	12-Oct	98	22-Sep
Killdeer	3-Aug	2	2	04-Aug	1	both days
Semipalmated Plover	31-Jul	8	25	14-Aug	11	07-Aug
American Golden-Plover	8-Aug	1	1	-	1	08-Aug
Sanderling	30-Aug	1	3	-	3	30-Aug
Least Sandpiper	30-Jul	7	16	26-Aug	10	06-Aug
Semipalmated Sandpiper	4-Aug	3	7	07-Aug	5	07-Aug
Unidentified Peep	30-Jul	4	33	16-Aug	18	7-Aug

Species	First Date	ALL OBS		Last Date	HIGH COUNT	
		# of Days	Bird Days		#	Date
Pectoral Sandpiper	1-Sep	2	2	20-Sep	1	both days
Wilson's Snipe	29-Jul	8	12	15-Oct	4	29-Jul
Long-billed Dowicther	7-Aug	1	1	-	1	07-Aug
Red-necked Phalarope	29-Jul	4	12	19-Aug	3	29-Jul
Spotted Sandpiper	29-Jul	35	67	21-Sep	5	07-Aug
Solitary Sandpiper	29-Jul	5	6	13-Aug	2	08-Aug
Lesser Yellowlegs	3-Aug	2	2	04-Aug	1	both days
Unidentified Shorebird	5-Aug	4	29	2-Oct	20	22-Aug
Parasitic Jaeger	24-Sep	3	3	29-Sep	1	all days
Bonaparte's Gull	30-Jul	11	90	17-Aug	16	01-Aug
Sabine's Gull	8-Sep	6	9	03-Oct	2	many days
Mew Gull	29-Jul	47	264	19-Sep	29	03-Aug
Herring Gull	29-Jul	68	596	20-Oct	40	many days
Thayer's Gull	29-Aug	46	444	20-Oct	96	08-Sep
Glaucous Gull	20-Sep	2	2	21-Sep	1	all days
Arctic Tern	29-Jul	15	92	19-Aug	19	05-Aug
Unidentified Gull	23-Aug	13	88	8-Oct	25	20-Sep
Band-tailed Pigeon	18-Sep	1	1	-	1	18-Sep
Great Horned Owl	5-Sep	1	1	-	1	05-Sep
Northern Hawk-Owl	19-Oct	1	1	-	1	19-Oct
Common Nighthawk	30-Aug	1	1	-	1	30-Aug
Rufous Hummingbird	14-Aug	1	1	-	1	14-Aug
Belted Kingfisher	29-Jul	49	48	14-Sep	3	04-Aug
Downy Woodpecker	18-Sep	5	5	01-Oct	1	all days
Hairy Woodpecker	20-Aug	7	7	17-Oct	1	all days
American Three-toed Woodpecker	19-Aug	16	19	16-Oct	2	many days
Black-backed Woodpecker	13-Sep	2	2	18-Oct	1	both days
Northern Flicker	2-Sep	4	4	11-Sep	1	all days
Unidentified Woodpecker	1-Sep	6	8	30-Sep	2	12/17-Sep

Species	First Date	ALL OBS		Last Date	HIGH COUNT	
		# of Days	Bird Days		#	Date
American Kestrel	16-Aug	33	106	18-Oct	13	17-Sep
Merlin	1-Aug	30	61	16-Oct	12	30-Aug
Gyrfalcon	13-Oct	1	1	-	1	13-Oct
Peregrine Falcon	26-Aug	16	28	28-Sep	7	30-Aug
Unidentified Falcon	26-Sep	1	1	-	1	26-Sep
Olive-sided Flycatcher	6-Aug	3	5	20-Aug	3	06-Aug
Western Wood-Pewee	6-Aug	3	3	24-Aug	1	all days
Yellow-bellied Flycatcher	14-Aug	2	2	20-Aug	1	both days
Alder Flycatcher	29-Jul	41	625	30-Sep	110	16-Aug
Hammond's Flycatcher	17-Aug	3	3	14-Sep	1	all days
Least Flycatcher	14-Aug	1	1	-	1	14-Aug
Say's Phoebe	7-Aug	2	2	18-Aug	1	both days
Northern Shrike	19-Aug	6	7	16-Oct	2	11-Oct
Warbling Vireo	29-Jul	18	31	05-Sep	5	05-Aug
Canada Jay	20-Aug	7	12	15-Oct	4	05-Oct
Steller's Jay	30-Sep	1	1	-	1	30-Sep
Black-billed Magpie	5-Sep	35	59	20-Oct	5	18-Sep
Common Raven	29-Jul	79	268	20-Oct	16	04-Oct
Violet-green Swallow	6-Aug	2	6	14-Aug	5	14-Aug
Bank Swallow	29-Jul	6	122	15-Sep	72	06-Aug
Cliff Swallow	6-Aug	5	7	19-Aug	2	5/14 Aug
Barn Swallow	6-Aug	1	1	-	1	06-Aug
Unidentified Swallow	3-Aug	7	124	16-Aug	49	4-Aug
Black-capped Chickadee	29-Jul	64	279	10-Oct	22	12-Sep
Mountain Chickadee	18-Sep	4	4	05-Oct	1	all days
Boreal Chickadee	18-Aug	37	505	17-Oct	71	17-Sep
Red-breasted Nuthatch	29-Jul	19	21	15-Sep	2	8-Aug/1-Sep
Pacific Wren	28-Sep	1	1	-	1	28-Sep
Golden-crowned Kinglet	17-Aug	5	6	24-Sep	2	04-Sep

Species	First Date	ALL OBS		Last Date	HIGH COUNT	
		# of Days	Bird Days		#	Date
Ruby-crowned Kinglet	30-Jul	44	170	14-Oct	24	14-Sep
Mountain Bluebird	17-Sep	2	3	20-Sep	2	20-Sep
Townsend's Solitaire	22-Aug	14	39	28-Sep	9	13-Sep
Gray-cheeked Thrush	27-Aug	1	1	-	1	27-Aug
Swainson's Thrush	29-Jul	22	45	18-Sep	6	20-Aug
Hermit Thrush	15-Sep	3	3	26-Sep	1	all days
American Robin	29-Jul	53	2736	19-Oct	1748	26-Sep
Varied Thrush	17-Aug	25	211	13-Oct	76	14-Sep
Unidentified Large Thrush	27-Aug	11	226	22-Sep	75	14-Sep
American Pipit	19-Aug	45	264	20-Oct	48	29-Aug
Bohemian Waxwing	11-Sep	29	2066	20-Oct	320	19-Oct
Cedar Waxwing	29-Jul	32	98	11-Sep	7	23-Aug
Unidentified Waxwing	16-Aug	1	8	-	8	16-Aug
Lapland Longspur	16-Aug	23	36	18-Oct	5	03-Oct
Northern Waterthrush	30-Jul	24	51	04-Oct	11	16-Aug
Orange-crowned Warbler	5-Aug	36	102	06-Oct	9	5/7-Sep
Common Yellowthroat	4-Aug	34	71	30-Sep	9	06-Sep
American Redstart	31-Jul	15	17	22-Sep	3	31-Jul
Yellow Warbler	29-Jul	49	288	25-Sep	20	12-Sep
Blackpoll Warbler	1-Aug	21	47	15-Sep	8	14-Aug
Yellow-rumped Warbler (Myrtle)	29-Jul	73	913	17-Oct	170	13-Sep
Townsend's Warbler	8-Aug	9	11	14-Sep	2	8/14-Aug
Wilson's Warbler	1-Aug	45	136	20-Oct	22	22-Aug
Unidentified Warbler	19-Aug	13	34	22-Sep	8	25-Aug
American Tree Sparrow	26-Aug	40	210	20-Oct	40	10-Oct
Chipping Sparrow	29-Jul	13	28	30-Aug	12	10-Aug
Fox Sparrow	20-Aug	25	31	20-Oct	4	07-Sep
Dark-eyed Junco (Slate-colored)	29-Jul	69	651	20-Oct	50	10-Oct
White-crowned Sparrow	12-Aug	27	74	20-Oct	32	29-Sep

Species	First Date	ALL OBS		Last Date	HIGH COUNT	
		# of Days	Bird Days		#	Date
Savannah Sparrow	11-Aug	26	46	30-Sep	5	12-Sep
Lincoln's Sparrow	16-Aug	15	22	15-Oct	4	12-Sep
Rusty Blackbird	1-Aug	38	368	16-Oct	65	14-Sep
Pine Grosbeak	17-Sep	13	229	20-Oct	54	18-Oct
Purple Finch	30-Jul	7	7	31-Aug	1	all days
White-winged Crossbill	29-Jul	32	184	30-Sep	28	01-Aug
Red Crossbill	6-Aug	4	7	30-Sep	4	06-Aug
Common Redpoll	7-Aug	24	405	20-Oct	103	20-Oct
Pine Siskin	29-Jul	27	61	16-Oct	9	02-Aug
Unidentified Small Finch	4-Oct	2	11	9-Oct	6	4-Oct
Unidentified Passerine	1-Aug	45	2285	17-Oct	584	13-Sep