

Mackenzie Nature Observatory

Mugaha Marsh Banding Station

2022 Annual Birding Report



Mugaha Marsh Banding Station is a cooperative project. Some of our main sponsors identify the project by a name and/or number:

Fish and Wildlife Compensation Program – Peace Region

Project name: Mugaha Marsh Banding Station, 2021-2022

Project Number: PEA-F22-W-2860-DCA

The Project is partially funded by the Fish and Wildlife Compensation Program (FWCP). The FWCP is a partnership between BC Hydro, the Province of BC, Fisheries and Oceans Canada, First Nations and public stakeholders to conserve and enhance fish and wildlife impacted by the construction of BC Hydro dams.

Environment and Climate Change Canada

Project Name: Migration Monitoring at Mackenzie Nature Observatory

Project No. GCXE22C004

This project was undertaken with the financial support of:

Ce projet a été réalisé avec le soutien financier de:

*Environment and
Climate Change Canada*

*Environnement et
Changement climatique Canada*

McLeod Lake Mackenzie Community Forest

Project: cell phone booster and improvements to Mugaha Marsh Banding Station

Bird Canada (BSC), Canadian Migration Monitoring Network

Mackenzie Nature Observatory (MNO) is part of the Canadian Migration Network. As such, we receive 75% of funds raised by individuals doing the Great Canadian Birdathon in support of MNO. The Birdathon is coordinated by Birds Canada.

Cover: approach to the station from near Net 12

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Mackenzie Nature Observatory is an incorporated society and a registered charity. Our members enjoy nature and we are involved in various projects. This report will attempt to give an overview of what we do.

Purposes of the Society:

- *To research, conserve, restore and assist in the management of the natural resources found in the Mackenzie, BC area.*
- *To promote the understanding and enjoyment of nature by providing opportunities for public participation and education in habitat enhancement, restoration and monitoring projects that will provide additional public knowledge regarding nature.*
- *To encourage and engage in the protection and restoration of threatened and endangered species with special attention to the preservation of essential habitats.*

Our Executive Committee:

President: Ryan Bichon
Vice-President: Stephanie Killam
Secretary: Angelina Joiner
Treasurer: Sarah Curtis
Directors: David Lambie
Sandra Kinsey
Sue Crosby
Director for BC Nature: Jeanne Shaw

PRESIDENT'S REPORT - 2022

I am pleased to report that we had a very successful season at the Mackenzie Nature Observatory's Mugaha Marsh Bird Banding Station in 2022. Many thanks to our banders for their enthusiasm and commitment. I think they did an outstanding job. And special thanks to everyone who volunteered to help out – you are what really keeps this program running!

In addition to banding lots of birds, we also had lots of visitors at the station this year, both for daytime bird banding and for night time owl banding. I have received many positive comments from people who visited the station in 2022. Everyone is very impressed with our banding activities, our station, and our enhanced progress reporting on social media, complete with lots of nice photos.

A huge thank you to everyone who helped make 2022 such a success! I look forward to another great season in 2023.

Ryan Bichon,
President



ACKNOWLEDGEMENTS

2022 was another busy year for members of MNO and we would like to say a big Thank You to everyone who volunteered their time to keep the project going. This was the Board's second year of working together to get the station ready and it was so much easier than last year. Thank you everyone! And, thanks to all our sponsors and donors for their continued support.

Thanks to all the volunteers who assisted at the station this year. Some of you came out early to help the banders and stayed for the full day; others came when they could and still other volunteers from out of town drove many kilometres to assist the banders. Together, our volunteers put in hundreds of hours at the station over the ten weeks.

Thanks to our staff, Laura Tabbakh, Kirstin Laviolette Lachance, and Zoe Roberts, for an amazing season at Mugaha and for donating their time on days off to do a lot of owl banding in September. Special thanks to Laura and Kirstin for their reports on the season. Thank you to Laura for keeping our Facebook page active; we had many positive responses.

Thanks go to these people for taking photographs with their own devices and sharing with us: Sue Crosby, Jeff Dyck, Sandra Kinsey, David Lambie, Laird Law, Kirstin Laviolette Lachance, Anne Spiers, Natalie Srochenski, Laura Tabbakh and UNBC student chapter of The Wildlife Society. Some of the photos will challenge your identification skills, but, rest assured, our banders know what they are doing! Mention of moulting birds is included. As you will see, moulting birds added another challenge to the identification of the birds.

Thanks to Sarah Curtis for writing the Funding Sources section and Sue Crosby for the report on the second year of monitoring Osprey and Bald Eagle nests. Thanks to Laird Law, Jeff Dyck and Angelina Joiner for reviewing the report and/or preparing photographs. Thanks to Ryan Bichon for the President's report. And special thanks to the others on the Board: Ryan, Stephanie, Sue, Sarah, Jeanne and Angelina, without whom we wouldn't have operated in 2022.

Thank you to Trudy Tremblay for whipping up curtains for the kitchen.

Many thanks go to Doug Thompson for obtaining the new flooring and installing it in the laboratory. Doug was ably assisted by Ron Crosby. See the photo of Doug and the new flooring on Page 9, bottom right photo.

We had a few visitors and volunteers-in-training who enjoyed learning about birds and our station. They all appreciated the birds. Some of them will be coming back next year as volunteers!

If you would like get involved in the station, including during the off-season, contact the club at the email address on the third page.

Visitors can also participate by sharing their eBird lists with the station. Username is MNOebird.

Happy Birding,

Sandra Kinsey and David Lambie

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MIGRATION MONITORING MUGAHA MARSH BANDING STATION, MACKENZIE, BC

Background

The migration monitoring program started in Mackenzie in 1994 as a cooperative project between the Canadian Wildlife Service (CWS) of Environment and Climate Change Canada, the forest industry and our club (Mackenzie Nature Observatory). We started the project when we were known as the Environment Section of the Mackenzie Fish & Game Association and when we wanted to become a charity we formed the Mackenzie Nature Observatory (MNO). For the first few years volunteers did bird surveys on transects in spring and fall as well as operating a banding station in the fall under CWS's permit. The first banding station (1994 & 1995) was at Gagnon Creek south of Mackenzie. In 1995, a banding station was started at Mugaha Marsh and in 1996 it became the only banding station. The station is a cooperative project supported by various government and non-government organizations and foundations, local businesses and individuals, the community of Mackenzie and many, many volunteers.

Mackenzie Nature Observatory is one of 25 member stations of the Canadian Migration Monitoring Network (CMMN), a collaboration of bird observatories from across the country, along with Birds Canada (formerly Bird Studies Canada) and the CWS. CMMN provides vital long-term



information on bird demographics and population trends for more than 200 bird species, and contributes

scientific data that advance the understanding of birds and other aspects of natural history in Canada.

Mackenzie Nature Observatory's volunteer Board of Directors supervises the seasonal operation of the station, raises funds, obtains permits, hires banders, recruits volunteers, and submits all appropriate data to the various agencies: the Canadian Bird Banding Office, CWS at the Pacific Wildlife Research Centre (PWRC), Birds Canada (BSC) and the BC Wildlife Species Inventory Database. CWS-PWRC is responsible for the regional analysis of the data and BSC for the national analysis of the data. Information from our Daily Estimated Totals Program is posted on the NatureCounts website (www.naturecounts.ca).

Mugaha Marsh Banding Station is located on the west side of the Rocky Mountains in the Rocky Mountain Trench in central British Columbia. It is east of the Parsnip Reach of Williston Reservoir. Some net lanes are actually in the floodplain of the reservoir when it is at or near full pond. To the west of the reservoir lie the Omineca Mountains. These landscape features create a funneling effect making Mugaha a suitable location to monitor the migration of species breeding in the forests and mountains of northern BC, Yukon and Alaska.

MNO follows a standardized protocol that meets the scientific requirements of CWS and CMMN. MNO supplies the specialized banding equipment, and laptops needed for the program, and has a banding lab on site. The banders are hired as employees of MNO and are covered by WorkSafe BC. MNO also carries third party liability insurance through BC Nature for the work done at the banding station.

Goals and Objectives

The migration monitoring program in Mackenzie has three broad goals:

- To monitor changes in the populations of small landbirds, that use and migrate through the Mackenzie area by providing annual indices of population numbers and structure, species composition, migration timing and possibly survival rates and indices of productivity. Of particular concern are species not effectively monitored by other survey methods (e.g. Breeding Bird Survey) and species showing declines in other regions.
- To understand migration ecology and its relationship to breeding dynamics and management issues, particularly the significance of Mugaha Marsh as a stopover site.
- To build partnerships within the community and between industry, naturalists, academia, First Nations, governments and interested citizens.

The program has several objectives:

- To identify and count individuals (observed and captured) daily of each species or subspecies, new and recaptures, using standard, nationally-accepted protocols during fall migration.
- To determine the age and sex composition of birds populations in order to provide a demographic picture of species who migrate through the area.
- To augment public interest and local knowledge of environmental issues through involvement and training opportunities.
- To produce annual reports. MNO will produce an annual report summarizing the season, containing numbers and composition of captures and recaptures, comments on habitat

changes, weather conditions and other factors that may have affected the capture of birds locally. CWS BC/Yukon Region will produce an annual report analyzing the data on a regional basis.

- To investigate the use of migration numbers as an index of productivity, particularly for forest birds.
- To support further integrated research.
- To reduce, where possible, biases in sampling by improving survey protocols and skills of observers, maintaining local vegetation structure and composition, and supporting consistency of the surrounding landscape of Mugaha Marsh. We will investigate the best measurements and influences of variation in capture population (e.g. age, sex, migratory status, moult, mass gain) and other, uncontrollable potential sources of biases (e.g. weather, habitat change in the surrounding landscape, insect outbreaks, water levels) on the observed trends and adjust analyses accordingly.
- To follow a standard protocol that meets the scientific requirements of CWS and CMMN.

Study Area

Mackenzie Nature Observatory's migration station is located at Mugaha Marsh, 14.5 km northwest of Mackenzie, B.C., latitude N55°23'55", longitude W123°12'30". UTM coordinates are 10U / 0486575 / 6139133.

The station lies within the Mugaha Marsh Sensitive Area, which was proclaimed under the Forest Practices Code of BC Act in 2001. The banding site is also within the McLeod Lake Mackenzie Community Forest.

Mugaha Banding Station consists of a permanent banding laboratory, living area, public wildlife viewing platform, parking lot, 32 net lanes (12 nets are used annually), and a daily census route. This site can be used for spring and fall banding.

The Recording Area boundary for counting birds extends from the trees at the southwest edge of the marsh, to the trees bordering the northeast bank of the pond, to include species not observed elsewhere in the marsh. For passerines and near passerines (woodpeckers, hummingbirds, swifts and kingfishers), the boundary extends west along the main road until hydro pole # 115, south along the main road until hydro pole # 107, and north in the forest along the trail to Tutu Bay, until the aspen with three pink ribbons. There is no set distance for all other non-passerines.

Methods (a summary)

Mugaha Marsh Banding Station operates only during the fall migration season, from July 19 to September 23 (67 days). The station operates 12 12-metre passerine mist nets for six hours starting at sunrise, weather permitting. This is our Standard Banding period. The nets are checked every 30 minutes, more frequently if conditions warrant. The banders and trained volunteers extract the birds from the mist nets and place each bird in individual bird bags. The birds are then taken back to the lab for the banders or trained volunteers to identify to species (and sometimes to subspecies), age and sex, and place a small metal band (with its own unique number stamped on it) on the bird's leg. The band number, species, age, sex, date, net and time are recorded along with measurements such as wing length, fat, presence of moult and weight. All this information, along with net and time, are noted. The bird is then released. The same data is collected on previously banded birds that are recaptured, unless it is a same day

recapture in which case the bird is released at the net.

A one-hour census is conducted over a standardized route each day, regardless of weather, recording all birds observed or heard in the Recording Area. In fall, this can be difficult as often birds do not sing; they merely make chip notes or, at other times, are silent as they flit through the vegetation.

In addition, casual observations of bird activity are recorded during the standard 6-hour banding period. Birds observed outside the 6-hour standard banding period may also be recorded, but these are kept separate from the observations during standard banding.

Totals from banding, recaptures, observations and census are used to compile an estimated total of the birds in or passing through the area each day.

Hummingbirds captured in the nets are banded when an authorized bander is present. The data for hummingbirds is kept separate from other songbirds and considered Non-Standard as not every year does the station have someone permitted to band hummingbirds.

Non-standard banding also includes using audio lures every night, in September, starting 30 minutes after sunset, for Northern Saw-whet Owls and Boreal Owls. One owl net and various songbird nets were used but owl banding is currently volunteer-based and is kept separate from the standard banding. Plans are currently in the works to develop a standardized owl banding protocol, which would stay separate from the passerine banding protocol.

REPORTING BANDED BIRDS

Banded birds help scientists track the movements of birds. If you find a banded bird it is important to note as much as you can about the bird. If the bird is found alive, please do not try to remove the band. This could result in an injury to the leg (banders use special tools when a band needs to be removed). Please note the following information:

1. Numbers, in sequence, appearing on the band or bands
2. Colours, codes and materials of any bands or markers in addition to a metal band
3. Date on which the bird or band was found or observed
4. Exact location the bird or band was found or observed
5. Species, sex and age of the bird (if known)
6. Whether the bird was alive, dead, injured, free, or trapped
7. How the bird died (if known)
8. Online: <http://www.reportband.gov>
or phone 1-800-327-BAND (2263).
or mail: Bird Banding Laboratory
12100 Beech Forest Road
Laurel, MD 20708

For more information on reporting band recoveries see the Environment Canada webpage on [How to report a banded bird - Canada.ca](http://www.canada.ca/en/environment-climate-change/services/bird-banding/how-to-report.html).
<https://www.canada.ca/en/environment-climate-change/services/bird-banding/how-to-report.html>



FUNDING, IN-KIND CONTRIBUTIONS, and VOLUNTEERS

The Mugaha Marsh Banding Station is a cooperative project with a variety of sources providing funding, in-kind donations and many hours of volunteer service. MNO extends a special “Thank You” to all our *sponsors*. Whether your contribution is financial, material or volunteer service your help is greatly appreciated.

Funding Sources

Thank you to everyone who provided financial support to the Mugaha Marsh Banding Station in 2022.

Mackenzie Nature Observatory gratefully acknowledges the **Fish and Wildlife Compensation Program** (www.fwcp.ca) for its financial contribution of \$22,858.50 to the Mugaha Marsh Banding Station for 2022.

Thank you to **Canadian Wildlife Service, of Environment and Climate Change Canada**, for committing \$10,000 for the 2022 season.

Thanks to the **McLeod Lake Mackenzie Community Forest** for the grant for \$5000 to help us improve our station. Part of the money was used to purchase a cell phone booster.

Thanks to Ray Sturney and Maureen Sargent, Angelina Joiner and Kim Wetten for participating in the 2021 Great Canadian Birdathon on behalf of MNO. We received \$1327.50 from **Birds Canada** for our share of the proceeds. For their 2022 Birdathon, Ray Sturney, Maureen Sargent and Angelina Joiner named MNO. Thank you for thinking

of us. As a CMMN banding station, MNO receives 75% of the funds they raise.

Thank you to **BC Hydro** for providing MNO with \$5000 to put towards site improvements. We purchased and installed new flooring in the lab building.

Thanks to the businesses and individuals who made donations to MNO in 2022: Chris Coxson and Lori Johnson of Ft. St. John, Nancy Krueger of Prince George, Maggie Marsland and Norm Bilodeau of Vernon, Angelina Joiner of Prince George, and the Provincial Services Employee Fund.



Receiving cheque from BC Hydro, March 14, 2022



Cleaning nest boxes, December, 2022

In-kind Support

Thank you to **BC Ministry of Forests, Lands, Natural Resource Operations & Rural Development** in Mackenzie for allowing us to store the two travel trailers and new camper, used for accommodations at the banding station, at their compound during the off season. Thanks to **Ron Crosby** for allowing us to store one of the campers at his place during the off season. The third trailer was sold in the summer of 2020, and a new camper was purchased this summer.

Thanks to the **District of Mackenzie** for grading the road to Mugaha Marsh and for allowing our banders and out-of-town volunteers to use the showers at the Municipal campground and Recreation Centre. We are also appreciative of the District's support in updating the Memorial Bench Plaque to honour John Lambie. Thank you to Sue Crosby for again coordinating. You can see the bench at the entrance to Net Lane 11.

Volunteers

A training and review workshop was held just before the station opened for returning and new volunteers. Everyone found it very helpful. The station will put on more in the coming years.

As last year, the station had a number of local and out-of-town volunteers and volunteers-in-training. Together, they put in 1988 hours during the 10 weeks the station was open.

Our local volunteers and volunteers-in-training were Ryan Bichon, Sue and Ron Crosby, Dany James, Dana Hopfauf, Karen

Jungnitsch, David Lambie, Barb and Ron Paterson, Melissa Pick, Kieran Sculley, Kirk Smith, Kalum and Alex and Natalie Srochenski, Doug Thompson, Trudy Tremblay and Jim Wellsman,

We also had volunteers and volunteers-in-training from out of town: Chris Coxson and Lori Johnson; Val Crowley and her three charges Marissa Boyde, JT Hayter and Aaron McVey; Christina Cutbill; Jeff Dyck; Lucile Jacques; Angelina Joiner; Sandra Kinsey; Laird Law; Jordan MacDonald; J.P. Medina; Carleen Paltzat; Erin Maxwell; and Jeannine Randall.

This does not reflect the many hours put in before, during and after the season by the MNO Board of Directors. In addition, the banders put in many hours of volunteer time for owling and assisting when they weren't scheduled to work. Our heartfelt thanks go out to them all.

And thank you to the many visitors who came and learned about our operation. We hope to see you again next year!



Window display at the Mackenzie Library, June, 2022



New curtains in the kitchen, August, 2022.

Visitors to Mugaha Marsh during the 2022 banding season

submitted by Sue Crosby

We were fortunate to be able to host a number of organized group visits to the station this year. Our banders and volunteers enjoyed showing off the station and answering questions. Special thanks to our Banders Laura, Kirstin and Zoe who willingly shared their extensive knowledge and experience with our visitors.

July

BC MLA for Prince George - Mackenzie, Mike Morris spent the morning of July 22 at the station. He was accompanied by his assistant Jesse Wright. They were able to observe our banding routine, visit net lanes and learn about our unique area. Mike then used his designated presentation time in the legislature in October to speak about the station. Here is the link to that presentation: <https://www.facebook.com/groups/131880384668/search/?q=mike%20morris> Many thanks go to Mike for his ongoing interest and support.



August

On August 10, a group of 14 seniors from the Mackenzie Autumn Lodge Society visited the station. Our Bander-in-Charge, Laura, demonstrated how we handle the birds, collect information, and band them. The seniors were able to visit the net lanes with banders and volunteers, handled some birds and enjoyed the sunshine and beauty of the marsh.

Valerie Crowley, Education Coordinator for the Chuntoh Education Society of Fort St. James, and three of her students spent three days at the station from August 24 to 26. They assisted the banders and volunteers with checking the nets, set up and take down, scribing and releasing birds. The group camped on site.

September

Kyle Tapper brought out his Leadership class from Mackenzie High School. His write-up follows:

My five-year-old son and I discovered the Mugaha Marsh last summer. A hidden gem in Mackenzie. From the first time we went there, I knew this was a place that I want to

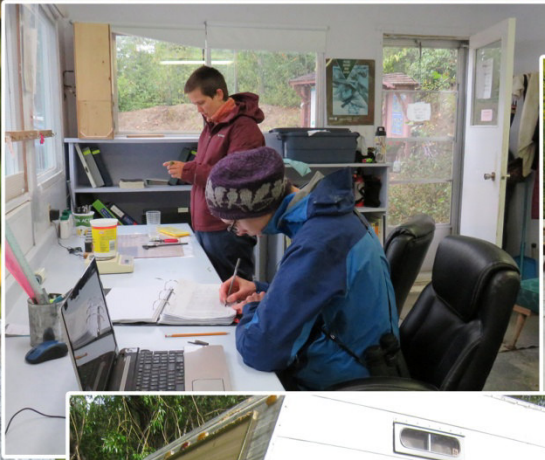
take him on a consistent basis, not only because of the beauty of the area but because of the bird-banders way of educating about birds, what they do and the importance of their work. We ended up going to Mugaha marsh on average twice a week for the entire summer. Once I returned to work at Mackenzie Secondary, I knew I had to introduce this area to some of our students. There are students in Mackenzie, who have been raised there, that had no idea about the bird observatory. Mugaha marsh is a close, hands-on, natural field trip that engages kids with the outdoors and the beauty of where we live and the birds we share the area with. This field trip opened the eyes of some of our students and introduced them to a part of our world that kids have lost due to the way schooling is and the advancement of technology. Students were focused, amazed and the look on their faces was what all educators wanted to see. Mugaha marsh is a gem, a treasure and we have it in our backyard. For as long as I am teaching in Mackenzie, from now on, I will always schedule at least one field trip in the fall.



A group of 10 seniors returned to the station on the evening of September 12 to observe a night of owl banding. It was a cool evening but the group was kept warm between net rounds with cookies and hot chocolate provided by station volunteers. Seeing Northern Saw-whet Owls up close and being able to touch them and learn about them was much appreciated by the group.

On Saturday, September 10, the UNBC Student Chapter of the Wildlife Society came for an overnight visit. When they arrived in the morning they were introduced to the station, given a brief history, a demonstration of banding and a tour of the station. In the evening they were able to observe owl banding. The group of 12 students camped on site and spent the next morning at the station helping banders and volunteers.





**Volunteers
and Banders
2022**

STAFF

Returning Bander-in-Charge for 2022 was Laura Tabbakh. Laura was introduced to banding and migration monitoring at the McGill Bird Observatory (QC) in 2016. She has since continued to train, work and volunteer at the Koffler Reserve (ON), Last Mountain Bird Observatory (SK), Thunder Cape Bird Observatory (ON), and Lesser Slave Lake Bird Observatory (AB), before landing at MNO in 2021. When she is not away from home on a contract, she remains a regular volunteer at McGill for spring and fall migration, MAPS, winter feeder banding, and Northern Saw-whet Owl and Snow Bunting banding.

Assistant Bander # 1 was Kirstin Laviolette Lachance. Kirstin got her first taste of bird banding in 2018 through an ornithology course at Vanier College in Quebec where she learned to ID, extract and band passerines. After graduating, she left the

banding world for a few years, and worked various positions, ranging from zookeeper to environmental technician, wildlife field assistant, and environmental educator. But it wasn't long before she was called back to bird banding. Her first job in this field was in 2021 as assistant bander for the Fall migration and owl banding at Prince Edward Point Bird Observatory (ON), followed by a MAPS contract with Owl Moon Environmental (AB) in summer 2022, right before joining us here at MNO 1 month into the fall migration season.

Returning Assistant Bander # 2 was Zoe Roberts. Zoe has banded birds at Vaseux Lake Bird Observatory and at MAPS stations in Summerland, BC. She has banded mainly songbirds in the past, and had her first experience with owl banding last year at MNO.



BANDERS' REPORTS

MNO BANDING REPORT 2022

*By Laura Tabbakh and
Kirstin Laviolette Lachance*

Standard Banding

Mackenzie Nature Observatory has operated a fall migration bird banding station at Mugaha Marsh each year since 1995, with the exception of 2020 where the station did not operate due to the Covid-19 pandemic. In 2022, standard banding occurred between July 19 and September 23 (67 days).

Overview

2022 was a slower than average year, with a total of **2350** birds banded, of **61** species (see Appendix 1). The average across all years and species from 1995 – 2021 is **2816** birds of **60** species (see Appendix 2). All things considered, we still had great diversity despite the low numbers as we caught many exciting and unusual species.

Exciting newly banded birds this year included (date in parenthesis indicates the last year the species was caught):

- **6 Black-and-White Warblers (2021)**, a species typically not found this side of the mountains
- **12 Ovenbirds (2021)**
- **1 Red-breasted Sapsucker (2021)**
- **1 Barn Swallow ((2012)**
- **3 Bank Swallows (2018)**
- **3 Northern Rough-winged Swallows (2018)**
- **4 Tree Swallows (2018)**

- **2 Eastern Kingbirds (2016)**
- **1 Western Wood-Peevee (2017)**
- **1 Blue-headed Vireo (2019)**
- **5 Red-eyed Vireos (2019)**
- **1 Belted Kingfisher (2011)**
- **1 Evening Grosbeak (2007)**
- **1 Northern Shrike (2006)**
- **1 Blue Jay (2013)**
- **1 Yellow-shafted flicker (2012)**

The top 12 species banded for 2022 were:

1. American Redstart (321)
2. Ruby-crowned Kinglet (206)
3. Swainson's Thrush (206)
4. Dark-eyed Junco (171)
5. Common Yellowthroat (149)
6. Magnolia Warbler (119)
7. Orange-crowned Warbler (111)
8. Pine Siskin (83)
9. Warbling Vireo (82)
10. Northern Waterthrush (80)
11. Least Flycatcher (73)
12. Yellow Warbler (73)

Notable misses included Audubon's Warbler and Brown Creeper.

Although we make note of below-average and above-average numbers, they do not mean much unless they are looked at in the long term. Indeed, many things can account for such numbers, such as weather conditions, breeding success, natural species cycles, changes in migration routes or timing, etc. Patterns can be extracted when the data is analysed over the span of many years, not over just one season.



1. American Redstart



2. Ruby-crowned Kinglet



12. Yellow Warbler



11. Least Flycatcher



3. Swainson's Thrush



10. Northern Waterthrush



4. Dark-eyed Junco



9. Warbling Vireo



5. Common Yellowthroat



8. Pine Siskin



7. Orange-crowned Warbler



6. Magnolia Warbler

Top 12 Species Banded at

**Mugaha Marsh
2022**

Weather

We had great banding weather in 2022, losing very few hours to rain or wind. Unfortunately, that great weather might have delayed or slowed down migration, and might be one of the reasons behind our slow year, too.

July was hot, with an average opening temperature of 12°C and an average closing temperature of 22°C.

The warm days kept flowing into **August**, with an average opening temperature of 11°C and an average closing temperature of 21°C. Just as last year, August was the windiest month, forcing some nets to shut early, but much less so than 2021. We had a few hours of rain here and there, but we were still able to open our nets every day.

Just as last year, **September** was unusually warm. The average opening temperature was 9° C and the average closing temperature was 19°C. We did not get frost at the station until the morning of the 14th, and it kept four nets shut for a couple of hours.

We had few forest fires to deal with this year. We were only affected with the smoke

from the fire in Tumbler Ridge on September 12-13. Coincidence or as a direct result from that smoke, September 12th was one of our best days, with 67 new banded birds!

Banding effort

12 mist nets were used this season: nets #32, 25, 26, 3, 9, 11, 12, 17, 19, 20, 21 and 22. This is the 11th year we have used this set of nets. Luckily, none of them were flooded at any point of the season, allowing us to use them all. The wind was also less of an issue this year, but when it did come up, it would force nets 3, 11 and 26 shut, as usual; on some days, net 12 also had to be closed early. One extremely windy day also forced us to shut nets 19 and 20 one net-round early. We had very little rain and no snow, so we were able to band every day (see Appendix 4).

The weasels continued to be a problem this year. The nets were again raised higher from the ground than optimal.

Overall, we managed a total of 4405.8 net-hours, compared to the average of 4220 net-hours for 1995 – 2021.



Standard Banding

Nonpasserines

Hawks - Accipitriformes, Accipitridae

Only **two Sharp-shinned Hawks** were banded, within the average of one a season, but well under the six birds we caught last year.



Sharp-shinned Hawk (Sandra Kinsey)

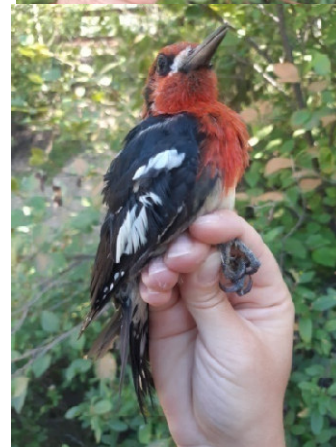
Woodpeckers - Piciformes, Picidae

2022 was a good season for woodpeckers. We banded **three Downy Woodpeckers**, **five Yellow-bellied Sapsuckers**, **one Red-breasted Sapsucker** and **four Northern Flickers** (three intergrade and one yellow-shafted), but no Hairy Woodpecker despite seeing them around the station on many occasions.



Northern Flicker (Chris Coxson)

While we caught more sapsuckers and flickers than usual (these species are not even caught every year), we banded less Downy Woodpeckers than their average of 8.



Yellow-bellied Sapsucker AHY (top),
Red-breasted Sapsucker HY (bottom)
(Photos Laura Tabbakh)

Kingfishers – Alcedinidae

We were overjoyed to find a beautiful **Belted Kingfisher** in our nets, only the 5th ever caught at MNO!



Belted Kingfisher AHY female
(Laura Tabbakh)



Eastern Kingbird HY (Laura Tabbakh)

Shrikes – Laniidae

Even more exciting (and perilous) than different flycatchers was catching a **Northern Shrike**, only the second banded at MNO!



Northern Shrike HY (Kirstin Lachance)

Passerines

Flycatchers - Tyrannidae

The flycatchers had a steady season, with almost all species being within their long-term averages. The **Alder Flycatchers** were scarce, with only **59** banded whereas their average is 89. The **Hammond's Flycatchers** also had a slow year, with **30** banded, average being 49.

We banded **6 Yellow-bellied Flycatchers** (average is 4), **30 Dusky Flycatchers** (average is 31), and **73 Least Flycatchers** (average is 84).

Two exciting catches occurred with flycatchers! We banded the first **Western Wood-Pewee** since 2017, and **two Eastern Kingbirds**, the 22nd and 23rd ever caught at MNO.

Vireos - Vireonidae

Again this year, vireos had a good season. The one exception was **Cassin's Vireos**, which we did not catch at all (a first since 2011) and only observed a handful of times. We did, however, band **1 Blue-headed Vireo**, which was a really nice surprise: the station has only ever caught 20. **Warbling Vireos** broke their record of 80, with **82** banded, and were very frequently observed in July and August. We also banded **five Red-eyed Vireos**, which was also a treat: the station has only ever caught 95, and some years, has caught none.



Red-eyed Vireo AHY (left) and Warbling Vireo (right) (Laura Tabbakh)

Corvids – Corvidae

Another great catch this year was **1 Blue Jay**, only the third ever banded at the station!



Blue Jay (Kirstin Lachance)

Swallows - Hirundinidae

Unlike last year, swallows were present at the station for all of July and a good portion of August. We were treated to 11 birds banded: **three Northern Rough-winged Swallows** (the station had only ever caught 10), **four Tree Swallows** (we have only ever caught 17), **one Barn Swallow**, the 25th ever banded, and **three Bank Swallows** – almost as many as the five the station has banded in the preceding 26 years!



Bank Swallow HY



Northern Rough-winged Swallow AHY



Tree Swallow HY



Barn Swallow HY (top)
AHY (bottom)

Chickadees - Paridae

The **Black-capped Chickadees** were unusually discreet this year. We banded only **17**, well below our average of 39. There were not many observed either. Black-capped Chickadees go through irruption years, and this year, just like the previous one, does not seem to be one.

While we sometimes catch a few Chestnut-backed Chickadees, this year, sadly, none were banded. They were neither heard nor seen at the station either.

Nuthatches - Sittidae

Red-breasted Nuthatches had a great (and fun!) year, with **15** banded, well over their average of 8. Eight of those 15 were actually caught on one single net round in September and were clearly migrating.

Creepers - Certhiidae

Brown Creepers were not banded and not detected this year at the station.

Wrens - Troglodytidae

Just as last year, no wrens were banded, although a Pacific Wren was seen (and even heard singing) on the census trail a few times in September.

Kinglets - Regulidae

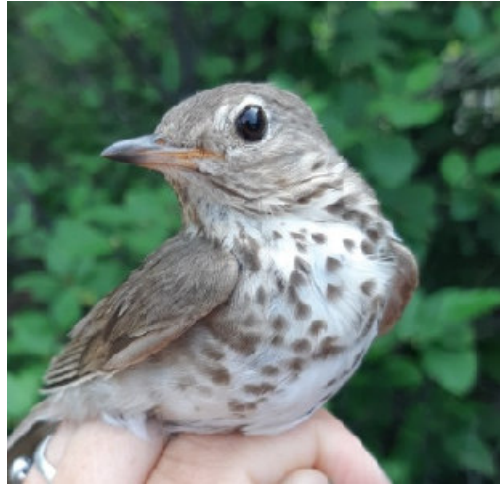
The **Ruby-crowned Kinglets** were the big surprise, as we banded only **206** (average is 391). Whereas they are usually the first or second most banded species, alternating with the American Redstart, they were only the 3rd this season thanks to one last push during the last week of banding. This is the lowest season ever for this species.

Golden-crowned Kinglets, at **50** banded, also had a season well under average (65).

Thrushes - Turdidae

This season was, overall, average for thrushes.

We banded **206 Swainson's Thrushes**, well above the average of **139**, as had been the case yearly since 2011, but less than the 238 of last year.



Swainson's Thrush AHY female
(Laura Tabbakh)

We caught only **12 Hermit Thrushes**, which is under average (19), and 3 **Gray-cheeked Thrush**, near the average of 2. We had a better year for **American Robins** than last year (**11** banded, while the average is 17), and they were frequently observed at the station and in full migration. We also caught **3 Varied Thrushes**, right on average.



Hermit Thrush (Laura Tabbakh)



Varied Thrush HY female
(Kirstin Lachance)

Waxwings - Bombycillidae

Cedar Waxwings were the only waxwings observed and banded, as usual. We captured **22**, at their average of 21 per season.



Cedar Waxwing AHY male (Kirstin Lachance)

New World Warblers - Parulidae

Overall, the warblers did poorly this year. Out of the 14 species of warblers we catch at the station, only 4 species ranked above their 26-year average: Ovenbird, Common Yellowthroat, American Redstart, and Magnolia Warbler.

However, looking at the numbers over the past 27 years (Appendix 2), we noticed strong fluctuations in yearly catches for most species. This might be what we experienced this year. There is no way of knowing until we see what future seasons bring.

The **Northern Waterthrushes** had a poor season, with 80 banded while the average is 171.

Only **26 Tennessee Warblers** were banded this season, well under their average of 52.

Even **Orange-crowned Warblers** were scarce this year, with **111** banded, well under the average of 157. This marks the first time since 2008 that the number caught is below the average.



Above: Tennessee Warbler AHY male



Left: Orange-crowned Warbler (left)
(Laura Tabbakh)

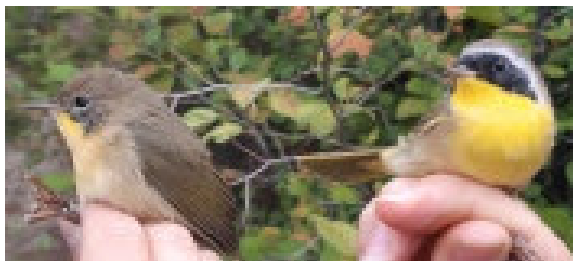
MacGillivray's Warblers (11 banded, average is 23). **Yellow Warblers** (73 banded, average is 99); **Townsend's Warblers** (4 banded, average is 15).



MacGillivray's Warbler
(Laura Tabbakh)



Townsend's Warbler HY male
(Kirstin Lachance)



COYE HY Male (left) and AHY Male (right)
(Laura Tabbakh)

Wilson's Warbler (43 banded, average is 88); and **Blackpoll Warblers** (8 banded, average is 26) had a record-low season.



Wilson's Warbler AHY male (Laura Tabbakh)

Yellow-rumped Warblers also had a low year, with **50** banded, again under their average of 132. This includes **Audubon's Warblers**, **Myrtle Warbler**, and the hybrids/unknown. No **Audubon's Warblers** were banded this year, and only **5 Myrtle Warblers** were accurately identified.

An exciting **12 Ovenbirds** were banded, well over their long-term average (5) and only one short of their record year of 2003.

149 Common Yellowthroats were banded, slightly above their average of 136.



Ovenbird (Laura Tabbakh)

Magnolia Warblers didn't break a record 2 years in a row, sadly, but with **119** banded; this year is still the 2nd best in the last 27 years. Let's see if we can keep this trend going!



Magnolia Warbler AHY Male (Laura Tabbakh)

We banded **321 American Redstarts**, a good bit above their average of 261. They were our first species banded this year, and we kept catching regularly until the month of September, when their numbers started to slow, and then one last very late migrant adult male on September 19th, which gave us exactly two months of Redstarts.



American Redstart AHY male
(Laura Tabbakh)



American Redstart HY male
(Laura Tabbakh)

The most exciting catch in the warbler family was by far **6 Black-and-white Warblers**, which included a breeding female, two adult males, and three juvenile birds, that's more in one year than the last 26 years put together! We are hoping to catch more of them next year – and even to recapture some of those banded this year!



Black-and-white Warbler AHY Male
(Laura Tabbakh)

Sparrows- Passerellidae

The low water levels continued this year, with no net lanes being flooded; however, this prime habitat did not bring in the sparrows. In fact, sparrow numbers were quite low.

American Tree Sparrow We had **5** banded, which is on the low end for the station (average is 8), but was still very exciting for us this year, since they were missing in action last year!



American Tree Sparrow HY



Chipping Sparrow AHY

(Photos Laura Tabbakh)

Chipping Sparrows were under the average this year again with **6** banded (average is 12), but it was still better than last year's 4. Only **2 Clay-coloured Sparrows** were caught this year, although last year none were caught, so we must see the silver lining.

Only **4 Savannah Sparrows** were banded this season, well under their average of 22, and the lowest number since 2013.



Savannah Sparrow AHY

Song Sparrow numbers were the lowest they've been since 2011, with **15** banded. Very few were heard or seen this year either.



Song Sparrow HY (Laura Tabbakh)

4 Fox Sparrows were banded, just below the average (6), but much more exciting than last year's 1! We had one at the beginning of the season, and then three right at the end to wrap up the season.



Fox Sparrow (Laura Tabbakh)

White-throated Sparrows had a slightly above average season, with **58** banded. The average is 43, and last year's total was only 45.

All **White-crowned Sparrows** were identified as the Gambel's subspecies for a total of **19 White-crowned Sparrows** banded, which is quite low for this species, whose average of the preceding 26 years is 41.



White-crowned Sparrow
Left: HY (Kirstin Lachance)
Right: AHY (Laura Tabbakh)

Dark-eyed Juncos are beautiful members of the sparrow family and are one of British Columbia's more abundant songbirds. At Mugaha, we have 3 different varieties: Oregon Junco, Slate-coloured Juncos, and the "unidentified Dark-eyed Juncos", which is the cute little intergrades between the Oregon and Slate-coloured Juncos. We had **132 Oregon Juncos**, **zero Slate-coloured Juncos**, and **39 Unidentified Dark-eyed Juncos**. This gave us a total of 171 juncos banded, much higher than the long-term average of 122, and Oregon Juncos beat their average (73) by almost double!

Lincoln's Sparrows saw a bit of an incline since the last 2 years, with **37** banded, which is still, however, below the average of 42. **Swamp Sparrows** had a slightly better year than most species with **9** banded, right on average (8).



Lincoln's Sparrow (Kirstin Lachance)

Cardinals, Grosbeaks, Buntings - Cardinalidae

For the first time in 15 years, we caught an **Evening Grosbeak!** It was a beautiful adult female that blessed us with her presence. That was an exciting day for all. Not so exciting for the extractor.



Evening Grosbeak HY female (Laura Tabbakh)

Western Tanagers had a pretty good season, with 41 banded, way above the average of 17.



Western Tanager AHY male (Laura Tabbakh)

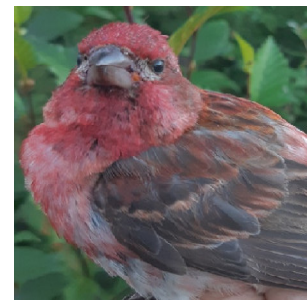
Blackbirds - Icteridae

Although we had Red-winged Blackbirds at the station for a good part of the season, we never caught any. This is not surprising, as only 12 were ever banded. Rusty Blackbirds and Brown-headed Cowbirds are regular catches, with a few banded every year, but they were also missing from our nets this season.

Finches - Fringillidae

Two species of finches were banded this year. We caught **83 Pine Siskins**, which was something of a relief after their absence from the nets last year.

We also banded **18 Purple Finches**, so they beat their record by 1 this year! Not to mention beating their average by almost 5 times as much (4).



Purple Finch AHY male (Laura Tabbakh)

Interesting Birds and Bird Facts

Second-year American Redstart

During their first summer, American Redstarts, whether male or female, all look the same: grey warblers with yellow markings. However, during their second summer moult, males become black and orange instead of remaining grey and yellow. Sometimes, with a little bit of luck, we catch a male right in the middle of his transition from grey-and-yellow to black-and-orange, and the result is this bizarre, colourful bird, showing two generations of feathers at once:



Females do remain grey and yellow all their lives, although you can still see a difference between the two generations in Second Year (SY) birds, from a faded grey-and-yellow to a slightly darker/more fresh grey-and-yellow.

Aging birds, using an example American Redstart

As you may already know, to age birds we look at multiple different characteristics, which vary from species to species. However, there are some traits that are quite universal when it comes to aging passerines,

such as the tail shape/wear, as well as the shape, color, and wear of the primary coverts (ppcovs). To put it simply, a young bird's tail will look very pointy, versus an older bird's, whose tail will be very broad and rounded. But what, exactly, does that look like?



Hatch Year (HY) tail, very thin and showcasing the pointy tips and fault bar across the rectrices.



After Hatch Year (AHY) tail, with very broad and truncate ends.

Second-year Sharp-shinned Hawk

Along the same line as the American Redstarts, Sharp-shinned Hawks start off as brown hawks and, during their second year, grow new slate-blue feathers. It was very exciting to catch a female “Sharpie” in the middle of said transition early in the season. Check out those looks...



Note the different ages of wing feathers on this Sharp-shinned Hawk SY female.



Sharp-shinned Hawk SY female

Blackpoll Warbler transitioning

Male Blackpoll Warblers look dramatically different in their spring plumage than they do in their fall plumage. While they are white with black streaked flanks and back, and a black cap in the spring, they revert to the classical green-and-yellow drab warbler plumage in the fall. And in the meantime? Well, as they moult their spring plumage into their fall plumage, this is what they look like:



Blackpoll Warbler
Above: Wing showing two
ages of flight feathers
(Kirstin Lachance)

Right: AHY male, moulting
(Laura Tabbakh)

American Redstart deformed bill

Sometimes we see deformities in birds. These could be due to lack of nutrients during development in the egg, i.e. the mother having a tough period during egg production, or a lack of nutrients during the crucial early nestling stage or fledgling stages. Lack of calcium or keratin for example could cause weak bones/beaks or lead them to develop wrong entirely. One such deformity we saw this season, was a

young American Redstart (yes AMRE, again!) with a deformed bill. So long as the deformity doesn't hinder them in escaping predators or searching for and acquiring food, it is no big deal to them! This guy had made it this long so he was obviously still able to catch insects, but it will be interesting to see if we catch him again next year, then we will know for sure if he overcame his trials.



Recaptures

Recaptures are birds that have already been banded and we catch again. There are three types of recaptures encountered at a banding station: Foreign Recaptures, Returns, and Repeats.

A **Foreign Recapture** is a bird that was banded at one station and recovered at another station. It is a rather rare occurrence, as birds tend to use the same migration routes and the same breeding and stopover sites year after year, making it unlikely to be caught elsewhere. A foreign recapture is always cause for much excitement, and we (sadly, but as expected) did not get any during our standard banding this year; neither did we hear of any bird banded at Mugaha getting caught at another station. However, we did catch a foreign recap during owl banding! We caught an after

second year female Northern Saw-whet Owl, with a very interesting moult pattern. We don't know where she was initially banded, because the band has not been entered in the North American Bird Banding database. What we do know, however, is that the band (and thus the owl) came from somewhere in either BC or Alberta. Hopefully next year we will know which banding station she came from, and we'll be able to update you all!

The second type of recapture is **Returns**: birds banded in a previous season and then recaptured any season afterwards. Although less exciting than foreign recaptures, returns tell us much about longevity and site fidelity.

The third type of recapture, and by far the most frequent, is called a **Repeat**: birds that are recaptured at the same station, the same season they were initially banded. This happens often when birds choose a site to breed, or to stop over in order to build fat reserves to continue their migration. In that case, the birds spend a long period of time around the station, making it more likely to get caught several times during the same season.

Returns are the most interesting, as they teach us about site fidelity and bird longevity. We did not have many notable returns this year. Most of them were banded in 2019 or 2021 (see Appendices 5 - 7). Only two of those were interesting birds. The first one was female Swainson's Thrush #2571-07856. She was originally banded in 2014 as a hatch-year bird. She came back in 2016, then twice in 2017 when she was identified as a female thanks to a brood patch. She then disappeared, until this year, when she was caught five times in the first week, still sporting a brood patch, and then she was gone again. The second one, also a

female Swainson's Thrush, is #2741-77453. She was banded in 2017 as a hatch-year of unknown sex, and had been MIA until this year, when she came back with a brood patch.



8-year old Swainson's Thrush AHY female
#2571-07856 (Laura Tabbakh)

Non-standard Banding – Hummingbirds and Owls

MNO did not conduct any hummingbird banding in 2022; however, we did make up for this by continuing our Non-standard Banding (NSB) of Northern Saw-whet Owl. And breaking last year's record of 108, by a single bird, making the new all-time record of **Northern Saw-whet Owls** banded in one season at **109!**

This year's owl banding program was run by our AB#1 Kirstin Lachance. Kirstin, Laura and multiple dedicated volunteers banded every night from August 31st to the closing day of September 23rd, excluding 3 nights with heavy rain which forced them to get an early night's rest. Nets were opened 30 minutes after sunset and stayed open for at least 2 hours every night. On their nights off, Kirstin and Laura stayed open for at least 4 hours/night.

We had two sets of nets for the NSB of owls in 2022, where we played the call-back audio recordings of the Northern Saw-whet

Owl (NSWO) and Boreal Owl (BOOW); the first was located up behind the banding station, off the census trail, and the second was located behind passerine nets 25 and 26, across the road from the banding station, next to the marsh. We will refer to them hereafter as the upper nets and lower nets, respectfully.

The upper nets are the ones historically used for owl banding and consisted of 3 nets set up in a U formation, without gaps between the connecting nets, with the call being played between them; these were nets 5, 6, and 30. This is also the location where we played the call-back of the BOOW for approximately the last 1.5 hrs of banding, as of September 15th. Sadly, our effort did not come to fruition, as we did not catch any BOOW this year.

The lower nets consisted of 4 nets. Three were set up in a similar formation as described above, with the speaker sitting in the middle; these nets were 35, 36, and 37. The first two were new net lanes implemented last year by Kristen Mancuso. This year, Kirstin pivoted Net 36 approximately 70 degrees, and added a new net lane between the two, that being Net 37. Another net lane was added further up the trail, away from the station and along the marsh, numbered 38.

Eight of our 9 nets used for owling this year were 36mm passerine nets, re-purposed for owl banding, including 25 and 26 which are also used during standard passerine banding hours. The ninth net used was a 60mm owl net, which, along with being made up of larger holes, has a thicker mesh, and is 2m longer than passerine nets. We chose to use this net for net lane 38 because the lane was longer than the others and in perfect NSWO habitat.

This year, we hosted 4 visitor nights, including 1 senior's night and 3 nights open to the general public. They were by sign-up only and were a great success! We caught owls each night for everyone to see, and Kirstin gave lively presentations to explain the banding process.

We banded a total of 109 Northern Saw-whet owls this season, along with 1 repeat and 1 foreign recap, with 710.75 hours of effort. And we did not band any Boreal owls, despite the 49.5 plus hours of effort. Compared to last year's totals and effort... it's not that impressive! Last year the owl banding effort for NSWOW was 319 net hours, less than half of our effort this year, and we only beat the total by 1 owl. The conditions were not favourable this season, with many bright, warm, and windy nights, but we didn't expect such a contrast to last year! Hopefully next year will bring more favourable conditions, and we can continue this uphill trend, with the number of owls

caught being more representative of the effort put in.



Northern Saw-whet Owl (Natalie Srochenski)



underwing under black light



top of same wing under normal light



12. Wilson's Warbler



1. Ruby-crowned Kinglet



2. American Redstart



11. Alder Flycatcher

Top 12 Species Banded at



3. Northern Waterthrush



10. Yellow Warbler



4. Orange-crowned Warbler



9. Dark-eyed Junco



5. Swainson's Thrush

Mugaha Marsh 1995-2022



8. Yellow-rumped Warbler



7. Common Yellowthroat



6. Pine Siskin

OBSERVATIONS AT THE BANDING STATION

by *Laura Tabbakh and Kirstin Laviolette Lachance*

Migration monitoring is not all about banding. A large section of our data comes from daily observations, or as we call them, “Obs.” During banding hours, we record all birds seen or heard in the station’s perimeter: these are the standard observations. Non-standard observations also take place occasionally, outside of banding hours.

Swans, Geese and Ducks

Waterfowl made up for a good chunk of our daily observations. Two **Trumpeter Swans** came in to the pond one day and **Canada Geese** flew overhead several times, honking loudly as they made their way to their migration paths. No other species of geese were detected.

Ducks were seen every day. **Mallards**, **Buffleheads** and **Ring-necked Ducks** were often seen, the latter with young. A raft of over 100 **American Wigeons** spent a couple of weeks in the marsh.

Species less often recorded include **Northern Pintail**, **Northern Shoveler**, **American Green-winged Teal** and **Gadwall**.

Upland Game Birds

As usual, the station hosted a family of **Ruffed Grouse** that were seen almost every day. However, not as usual at all was the pair of **Spruce Grouse** once spotted on census in September.

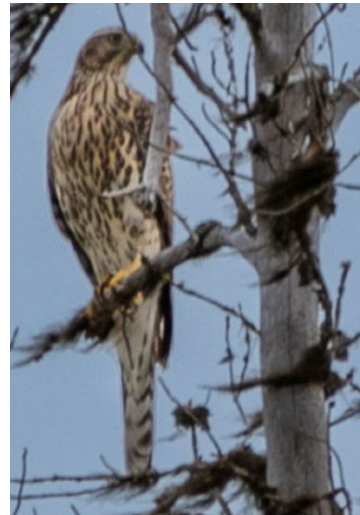
Hawks and Eagles

The hawk most commonly seen this year was a **Northern Harrier** that took to hunting in the marsh on an almost-daily basis.



Northern Harrier (Kirstin Lachance)

As usual, **Sharp-shinned Hawks** were often seen. **Cooper’s Hawks** were observed on scarce occasions, but the most exciting sighting was undoubtedly the **Northern Goshawk** that spent a couple of hours around the beaver pond.



Northern Goshawk (Ann Spiers)

We saw and even heard **Red-tailed Hawks** several times, but they were the only **buteos** observed this year.

In the eagle department, **Bald Eagles** made frequent visits, most of them immature individuals. **Ospreys** were a daily sighting, as usual, well into September. Again, this year, we are not sure whether they had a successful nest around the station, but they sure were seen carrying building material and food.

Loons, Grebes and Coots

Common Loons kept us company everyday almost until the last day. We had two of them set up residency in the beaver pond and the ponds down the Tutu Bay trail. We also had several sightings of loons migrating.

Several species of grebes used both the marsh and the pond. **Pied-billed Grebes** and **Red-necked Grebes** were often seen at the beginning at the season, and a couple of families of **Horned Grebes** raised their young at the station before leaving.

Unlike last year, **American Coots** were scarce and only showed up at the end of the season.

Hérons and Cranes

Great Blue Herons were seen almost every day this year. At least two of them spent the months of August and September around, and were very interested in the Osprey nests that were not being used. A third one would sometime show up, but never stayed around for long.

Likewise, a pair of **Sandhill Cranes** also spent most of the season around the station and would often be the first birds heard in the morning.

Shorebirds

Shorebirds gave us a run for our money this year (should we say, “As usual”?). They often kept their distance and were difficult to identify, ending up on our observation list as “Shorebird sp.” However, amidst the confusion, we were able to identify both **Greater** and **Lesser Yellowlegs**, **Spotted**, **Solitary**, **Least** and **Pectoral Sandpipers**, **Red-necked Phalarope** and **Wilson’s Snipe**.

A **Sora** was heard singing every day for the first few weeks in the marsh, infuriatingly close to Net 3, and yet never getting caught in it.

Gulls

We did not get many gulls this year, but the ones we did see were identified as **Ring-billed**, **Herring** and **Bonaparte’s Gulls**.

Owls

As expected, we regularly heard a pair (and possibly more) of **Great-Horned Owls** duetting and we had a few **Barred Owls** singing and screeching during owl banding. **Northern Saw-whet Owls** often barked and quipped back at the audio-lures set up for them as we were trying to catch them in our nets.

Goatsuckers

Common Nighthawks were seen and heard every night at dawn and dusk for a few weeks at the beginning of the season, until they migrated out.

Hummingbirds

Both **Rufous** and **Calliope Hummingbirds** were seen at the station and enjoyed the feeder we put up for them. A strange visit happened weeks after the last hummingbird had been seen and the feeder taken down. A female Rufous Hummingbird showed up out of nowhere and went straight for the spot where the feeder used to hang, returning stubbornly to it until we put it back up. She stayed a couple of days and then she was gone. Our best explanation is that she was one of our regulars until she left then came back – although why she would come back at all, we have no idea.



Rufous Hummingbird (Anne Spiers)



Calliope Hummingbird (Chris Coxson)

Kingfishers

Belted Kingfishers were often seen at the station, and at least two individuals summered over before they finally left on their migration.

Woodpeckers

Northern Flickers were, by far, the woodpeckers most commonly observed. Other species included both **Hairy** and **Downy Woodpeckers**, both **Yellow-bellied** and **Red-breasted Sapsuckers**, and **Pileated Woodpecker**. The most interesting find was a **Three-toed Woodpecker** seen as we were setting up our owl nets.

Falcons

Merlins were very active around the station, and we had three spend a few weeks up here. Sadly, we never caught any.



Merlin (Anne Spiers)

American Kestrels were scarce this year. The most memorable sighting of one was the day a handsome male was seen hovering endlessly over the marsh. We got tired of watching him and marvelling at his stamina before he got tired of hovering – and that's saying something.

Flycatchers

As usual, **Alder Flycatchers** were singing daily in the marsh for the first half of the season. Other species often observed included **Least**, **Hammond's** and **Dusky Flycatchers**.

Olive-sided Flycatcher and **Western Wood-Pewee** were also heard on a handful of times, but no species of phoebes were recorded.

Two pairs of **Eastern Kingbird** bred in the marsh and the beaver pond. We saw them and their offspring daily for the first month of the season, bringing to 7 the total of Kingbirds living at the station over the summer!

Vireos

As expected, **Warbling Vireos** were abundant throughout the season, and we even recaptured one two days before closing.

Cassin's Vireos were missing this year! We only heard one singing late in the season but

caught none. We did, however, hear **Blue-headed Vireos** several times, and even banded one.

Red-eyed Vireos were unusually numerous this year. On top of banding them and even recapturing them, we heard them quite often in the same area, all of which leads to believe they spent a few weeks over on their way South.

Jays and Crows

It comes as no surprise that we saw **Common Ravens** every single day and **American Crows** almost as often. A notable sighting was a conspiracy of 21 ravens, probably this year's youngsters, flying over as we were opening our nets one morning, and it was a treat to see them ride the winds playfully as they made their way over the marsh.

What did come as a huge surprise was the presence of a (a few?) **Blue Jay** over four days in September. This is the second year in a row a Blue Jay has been detected at the station. To be continued.

Sadly, no **Canada Jay** was seen at the station this year. Let's hope we just missed them, rather than them missing us!

Swallows

What a difference between this year and the last for swallows! The marsh was bustling with them for several weeks, which was a real joy. Species (painfully) identified included **Tree, Barn, Bank, Northern Rough-winged,** and **Violet-green Swallows.**

A pair of Tree Swallows bred in one of the nest boxes at the marsh, and we were lucky to have a nest of Barn Swallows over the door of the lab! The parents were unfazed by our work right under their house and we were able to watch daily as the three chicks grew and eventually were ready to leave.

We are happy to report that Barney, Sally and Gary have all fledged successfully.



Barn Swallow nestlings HY

Chickadees

Although **Black-capped Chickadees** were observed almost daily at the station, we didn't get as many as last year. One **Mountain Chickadee** was seen on census, and after we'd waited for them all season, a single **Boreal Chickadee** was heard then seen on the very last day... right after we had closed our nets for the season.

Nuthatches and Creepers

Red-breasted Nuthatches were detected daily at the station and included both resident and dispersing birds. **Brown Creepers**, on the other hand, were nowhere to be seen or heard this year.

Wrens

Although wrens were (thankfully) not found in our nets, a **Pacific Wren** was heard a few times along the census trail.

Kinglets

This year was very slow for kinglets. Both **Golden-crowned** and **Ruby-crowned Kinglets** came in much lower numbers than usually, but they came a lot earlier than last year and we often banded kinglets of both species so young we needed to walk them back to their parents when we were done.

Thrushes

Swainson's Thrushes were by far the most common thrushes at the station, whether in our nets or in the bush. They came early, stayed late, and were observed almost on a daily basis. **Hermit Thrushes** were present at the beginning and the end of the season but were absent for most of it. **American Robins** were seen migrating in small flocks on several occasions, and **Varied Thrushes** were heard singing on some early mornings. We had no Mountain Bluebirds this year, but we did see one **Townsend's Solitaire** one day before the end of the season – and sadly, that's all we saw of it.

Pipits

American Pipits were seen on a couple of occasions, once flying over at the end of the road, and the second time over the marsh. Both times, it was a small flock that was observed.

Waxwings

Cedar Waxwings were the only waxwings observed this season. They came in much smaller numbers than last year, and they did leave earlier, too.

Warblers

Different species of warblers were observed through the season, with **Common Yellowthroats** making up for the bulk of them. **American Redstarts** were also commonly seen and heard. **Northern Waterthrush** and **Magnolia Warbler** could be seen and sometimes heard singing as well.

Less commonly detected were **Orange-crowned**, **Yellow** and **Wilson's Warblers**, although we banded a healthy number of Orange-crowned Warblers. **Yellow-rumped**

Warblers were the one species of warblers that we saw actively migrating, as they flew over alone or in small flocks.

Townsend's and **MacGillivray's Warblers** were scarcely seen outside of our nets, but the first record of a Townsend's Warbler this year was on census rather than in the nets.

Tanagers

We had quite a high number of **Western Tanagers** this year, both in the bush and in our nets. They were present from the first day of the season then well into August.

Sparrows

Dark-eyed Juncos were by far the most abundant sparrows observed at the station, especially in the last weeks. **White-throated Sparrows** were detected daily from day one to the last day and were singing at the beginning and the end of the season.

Song, **Swamp** and **Lincoln's Sparrows** were all heard singing at the beginning of the season, then essentially disappeared, although the Lincoln's Sparrows made a brief come-back around mid-September.

White-crowned Sparrows started showing up in the last few weeks, and even **Fox Sparrows** graced us with their presence. **American Tree Sparrows** were few and far between in the nets, and we saw even fewer in the field, with only 2 seen during census on one rainy day, and a couple more after banding hours nearing the very end of the season.

Blackbirds

Red-winged Blackbirds bred on the marsh and were part of the daily crowd well into August. We had a few records of **Rusty**

Blackbirds and **Brown-headed Cowbirds** just flying over, probably on their migration route.

Finches

This year was a great difference from the last when it came to finches. **Pine Siskins** were constantly moving through the station, as well as **White-winged Crossbills** and even some **Red Crossbills**. **Purple Finches** were also observed on a regular basis.

OTHER WILDLIFE OBSERVATIONS AT THE MARSH

by Laura Tabbakh and Kirstin Laviolette Lachance

Wildlife sightings at and around the station were rather few this year. For starters, there were no **big cats** spotted this year, much to everyone's chagrin!

But then of course, there was the **Moose**. At least five different individuals, including a calf, were identified throughout the season, whether in the marsh or on the road leading up to the station. One morning, we noticed moose tracks on the road around the banding lab and all the way onto the parking lot!

We did not see **Mule Deer** around the station this year, but a few **White-tailed Deer** were spotted here and there on the road leading up to the lab.

Black Bears were often spotted on the road leading to the station, and one of them was even seen right past the Far Far nets. Luckily, they were very polite bears and never came nearer than that – at least, not that we noticed.

Although we did not see **coyotes** at the station, we heard them yipping on the other

side of the marsh on several occasions. Unlike last year, we saw no sign of their presence (scat, tracks) at the station itself.

Beavers were present in both the marsh and the pond; at least three of them were living in the lodges. There was also a **muskrat** spotted on several occasions, usually in the marsh, and at least three **river otters** were seen in the pond.

We caught a glimpse of **American Marten** twice during the season, and many, many, *way too many*, glimpses of the resident family of **Short-tailed Weasels**.



Jean, the Short-tailed Weasel (Kirstin Lachance)

Of course, **Red Squirrels** were seen and heard daily, but what was more interesting was the one sighting of a **Least Chipmunk** right on the parking lot! They are not often detected in the area, although we did see a couple last year as well. One of our volunteers also had a **Northern Flying Squirrel** squeeze between his tent and the fly one night, which made for a great story – and a cool record!

Surprisingly (and sadly), we saw no **bats** at the station this year. Luckily, this also means we caught none in our nets during owl banding.

As usual, **Common Garter Snakes** were often seen basking in the sun near net 11. However, it was unanimously felt by all volunteers and staff that we had a lot less of them this year...

Western Toads and **Wood Frogs** were seen regularly, especially during owl banding when the toads were the most active. Those late nights out also brought sightings of **Long-toed Salamanders**, which we thought were very cool!



Common Garter Snake (*Thamnophis sirtalis*)



Western Toad (*Anaxyrus boreas*)
(Kirstin Lachance)

Last but not least, butterflies, dragonflies and damselflies were around almost daily and well into September, despite the chilly mornings. Most butterflies were **Mourning Cloaks** and **anglewings**, as well as some **swallowtails**. We were lucky this year, as we had very few dragonflies get caught in our nets – but does that mean there were fewer of them around?



Compton's Tortoiseshell
(*Nymphalis l-album*) (Kirstin Lachance)



Lake Darner (*Aeshna eremite*), a dragonfly
(Kirstin Lachance)



Larva of Large Gray Dagger, a moth (*Acronicta insita*), (Sandra Kinsey)

OSPREY NEST MONITORING PROJECT

By Sue Crosby

In the early part of May, 2022, 13 nests within a 10 km radius of Mackenzie town site were identified with Osprey activity. All of these nests had at least one Osprey hanging around, most had two adults. During June and July a number of adults at nests showed defensive behaviour when being observed, which led to speculation of the existence of eggs.

A lone chick was observed on a number of occasions on Nest OS 2 located on Morfee Mountain road near Morfee Creek. This has proven to be a productive nest last season and this as well as a number of previous years.



There was no activity observed on a nest built last season on a light standard at Little Mac Ski Hill.

There was quite a lot of activity observed at OS 1, a nest built on an old light at the rodeo grounds. The adults were very assertive with their voices and displayed quite aggressive behaviour when the nest was approached. The female was observed scrunched low in the nest as well, however no chicks were observed.

Both nests near the Dunkley sort yard had pairs hanging around. One very amorous couple was observed engaged in some Osprey gymnastics atop one of the nests in early June. In mid July the pair was in the area still but did not appear to be attending to the nest.

There were some nests that succumbed to the wind over the winter. A nest on the marsh at Mugaha constructed in 2021 came down. A pair of Ospreys was observed building and attending to a nest on the inner pond. This was a tricky nest to spot, the best observing location being at the edge of Net lane 12. No chicks observed. A large nest OA 11, up the hill from Mischinsinlika Creek also came down and was replaced on the same pole by another nest, though no Ospreys were observed over four visits.

The largest nest in the area on the power lines near Gataiga Creek, OS 10, had a vocal and aggressive pair on it in June and part of July. When back for a third observation, it was found that the nest appeared abandoned and the pair was now attending to a new nest closer to the train tracks.

Many thanks to Jim Wellsman and Sue Crosby for the time spent with this project.



Interesting Osprey Facts:

(courtesy of the Kootenay Lake Osprey Nest Monitoring of the Friends of Kootenay Lake Stewardship Society)

- Chicks are very adept at remaining inconspicuous in the nest, which is a challenge when doing observations.
- New nests can be built up in response to previous year's nest being occupied by Canada Geese.
- Prolonged wet weather, predation by Bald Eagles, and lack of fish can affect survival rates.
- Ospreys subsist almost entirely on fish.
- Females are larger than males.
- Immature Osprey will often playhouse and build a nest but not breed until 3 years of age.
- Ospreys tend to mate for life and will often return to the same nest every year.
- Ospreys winter in Mexico and Central America. Young do not return to BC until they are 18-20 months of age.



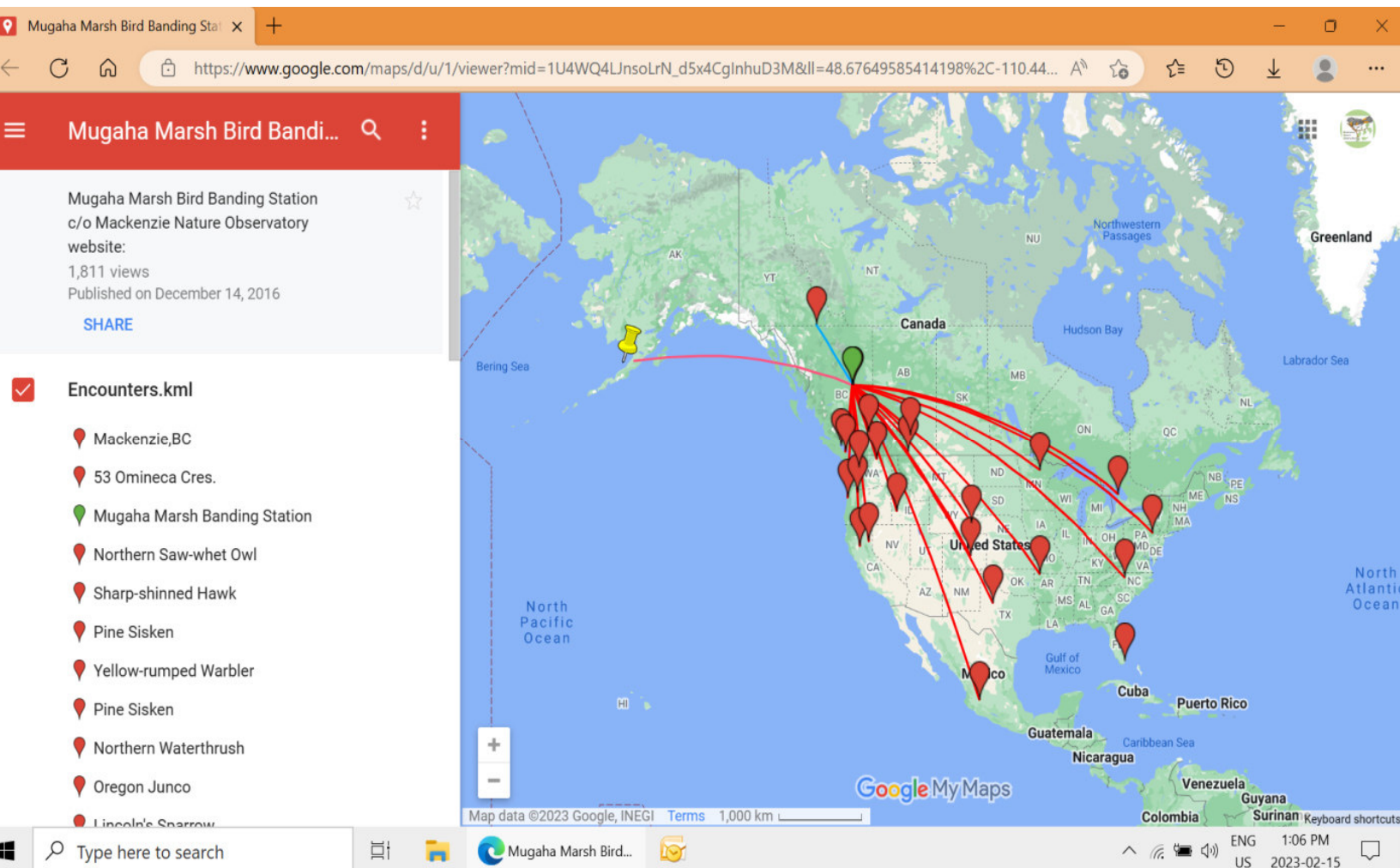
ENCOUNTERS

Over the years, a number of Mackenzie banded birds have been recaptured elsewhere on the continent. Most were banded at Mugaha Marsh. The farthest a Mackenzie bird travelled was 4229 km to Guadalajara, Mexico. It was a Lincoln's Sparrow banded at Mugaha on August 8, 2012, and not recaptured until January 31, 2015. Other encounters have been Sharp-shinned Hawk, Ruby-crowned Kinglet, American Robin, White-crowned Sparrow, Northern Waterthrush, Pine Siskin, Purple Finch, Yellow-rumped Warbler.

We have caught two birds banded elsewhere. One was a hatch year Wilson's Warbler, banded at Mother Goose Lake on the Alaska Peninsula on Aug 14, 2000. We caught him September 10, a month later. The other bird was a Northern Saw-whet Owl banded north of us. We caught it September 18, 2022. Stay tuned to our Facebook page for the provenance of this bird. We will be mentioned in next year's report.

An interactive map is available at

[Mugaha Marsh Bird Banding Station, Mackenzie BC Bird Encounters - Google My Maps](https://www.google.com/maps/d/u/1/viewer?mid=1U4WQ4LJnsoLrN_d5x4CglnhuD3M&ll=48.67649585414198%2C-110.44...)



APPENDICES

Appendix 1: Monthly Summaries of Daily Standard Banding, Fall 2022, Mugaha Marsh

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Birds Banded by Month				Birds Banded by day in July																
Species	JUL	AUG	SEPT	TOTALS	19	20	21	22	23	24	25	26	27	28	29	30	31	CODE		
Sharp-shinned Hawk		2		2														SSHA		
Belted Kingfisher	1			1				1										BEKI		
Yellow-bellied Sapsucker	5			5	1		2		1					1				YBSA		
Red-breasted Sapsucker	1			1													1	RBSA		
Hybrid Sapsucker		1		1														HYSA		
Downy Woodpecker	3			3	2						1							DOWO		
Northern Flicker	2	2		4		1							1					NOFL		
Yellow-shafted Flicker		1		1														YSFL		
Flicker intergrade	2	1		3		1							1					FLIN		
Western Wood-Pewee		1		1														WEWP		
Yellow-bellied Flycatcher	1	5		6					1									YBFL		
Alder Flycatcher	13	45	1	59	3		2	2		3		1			1	1		ALFL		
Least Flycatcher	35	35	3	73	7	1		3		3	2	5	3	4	4		3	LEFL		
Hammond's Flycatcher	5	20	5	30	1			1					1		1	1		HAFL		
Dusky Flycatcher	16	10	4	30	1	2	3	1	2		1	1	2	2		1		DUFL		
Eastern Kingbird		2		2														EAKI		
Blue-headed Vireo		1		1														BHVI		
Warbling Vireo	15	65	2	82			2		2	1	1	3	2		1	3		WAVI		
Red-eyed Vireo		5		5														REVI		
Northern Shrike		1		1														NSHR		
Blue Jay			1	1														BLJA		
Black-capped Chickadee	3	8	6	17								1		1		1		BCCH		
Northern Rough-winged Swallow	3			3								3						NRWS		
Bank Swallow	3			3									3					BANS		
Barn Swallow	1			1				1										BARS		
Ruby-crowned Kinglet	13	12	181	206	3			1	1	1	1	1	3		2			RCKI		
Golden-crowned Kinglet	4	5	41	50				2				2						GCKI		
Red-breasted Nuthatch		5	10	15														RBNU		
Townsend's Solitaire		3	1	4														TOWA		
Varied Thrush		2	1	3														VATH		
Gray-cheeked Thrush			3	3														GCTH		
Swainson's Thrush	49	116	41	206	7	7	2	8	8	1	1	4	1	1	5	1	3	SWTH		
Hermit Thrush	3	1	8	12	1	1				1								HETH		
American Robin	9	1	1	11	1	1	1				3				3			AMRO		

Appendix 1: Monthly Summaries of Daily Standard Banding, Fall 2022, Mugaha Marsh

Page 2 of 6

Birds Banded by Month					Birds Banded by day in July													
Species	JUL	AUG	SEPT	TOTALS	19	20	21	22	23	24	25	26	27	28	29	30	31	CODE
Cedar Waxwing	14	8		22	4	1	1	1	1				2			2	2	CEDW
Evening Grosbeak	1			1								1						EVGR
Purple Finch	13	5		18	1		2	1	1	1	2				2		3	PUFI
Pine Siskin	37	23	23	83	2			2	3	1	1	5	5		3	6	9	PISI
Chipping Sparrow	3	2	1	6		1		2										CHSP
Clay-colored Sparrow		2		2														CCSP
American Tree Sparrow			5	5														ATSP
Fox Sparrow	1		3	4							1							FOSP
Dark-eyed Junco	7	14	150	171	0	0	0	1	1	0	0	0	1	3	1	0	0	DEJU
Unidentified Dark-eyed Junco	7	6	26	39				1	1				1	3	1			UDEJ
Oregon Junco		8	124	132														ORJU
White-crowned Sparrow			19	19	0	0	0	0	0	0	0	0	0	0	0	0	0	WCSP
Gambel's White-crowned Sparrow			19	19														GWCS
White-throated Sparrow	19	16	23	58	3	2	1		2			2	3	1	2	3		WTSP
Savannah Sparrow		3	1	4														SAVS
Song Sparrow	12	2	1	15		3		3	1	1			1	1		2		SOSP
Lincoln's Sparrow	21	8	8	37	3	2	5	4	1		1	2	2				1	LISP
Swamp Sparrow	7		2	9				2	2	2	1							SWSP
Ovenbird	2	8	2	12									1				1	OVEN
Northern Waterthrush	31	49		80	2	3	1		4		5	2			10	1	3	NOWA
Black-and-white Warbler	5	1		6	2		3											BAWW
Tennessee Warbler	13	10	3	26	2		1	4	2	1	2				1			TEWA
Orange-crowned Warbler	32	42	37	111		1	3	9	4	3	6	1	1	2		2		OCWA
MacGillivray's Warbler		11		11														MGWA
Common Yellowthroat	68	38	43	149	12	4	8	6	2	3	4	3	11	4	5	4	2	COYE
American Redstart	83	220	18	321	6	2	3	2	4	7	7	4	9	9	20	6	4	AMRE
Magnolia Warbler	20	86	13	119		1	1		1			1	2	6	3	3	2	MAWA
Yellow Warbler	44	29		73	3	3	4	2	4	2	1	1	4	3	6	4	7	YEWA
Blackpoll Warbler	2	4	2	8								1	1					BLPW
Yellow-rumped Warbler	17	5	28	50	0	0	2	4	1	5	1	1	1	1	0	1	0	YRWA
Unknown Yellow-rumped Warbler	16	4	25	45			2	4		5	1	1	1	1		1		UYRW
Myrtle Warbler	1	1	3	5					1									MYWA
Townsend's Warbler	4			4								3	1					TRES
Wilson's Warbler	4	24	15	43									1	1	1	1		WIWA
Western Tanager	35	6		41	12	3	3	1	5	2	4	2	1			2		WETA
Total Individuals	680	964	706	2350	79	39	50	64	54	38	45	51	63	40	71	45	41	Total
# species	45	46	36	61	25	21	22	25	24	19	21	26	26	16	20	21	16	# species
Net Hours	921	1972.8	1512	4405.8	67	67.5	72	72	66.5	72	72	72	72	72	72	72	72	Net Hours
Birds per Net Hour	0.74	0.49	0.47	0.53	1.18	0.58	0.69	0.89	0.81	0.53	0.63	0.71	0.88	0.56	0.99	0.63	0.57	Birds/net hr

Appendix 1: Monthly Summaries of Daily Standard Banding, Fall 2022, Mugaha Marsh

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	Birds Banded by day in August																																
CODE	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	CODE	
SSHA		1																	1													SSHA	
BEKI																																BEKI	
YBSA																																YBSA	
RBSA																																RBSA	
HYSA											1																					HYSA	
DOWO																																DOWO	
NOFL					1											1																NOFL	
YSFL															1																	YSFL	
FLIN					1																											FLIN	
WEWP																		1														WEWP	
YBFL											1	1				1		1				1										YBFL	
ALFL		2			3		3	2	1	4	1	3	1	2	2	2	2	2	1	2		5	6	1	1		1					ALFL	
LEFL	3	2	5	2	4	1	3	2		2	1	1	1	1		1	2	1					1					1	1			LEFL	
HAFL	1						1	1	2	3	1		3			2	4	1								1						HAFL	
DUFL			1				1		1	1		1	1				1					1		1	1		1					DUFL	
EAKI					1					1																						EAKI	
BHVI																					1											BHVI	
WAVI	2	1	5		2	3	3	1		3	2	2	5		2	15	2	1	2	1		4						4	3	1	1	WAVI	
REVI	1	1				1															1							1				REVI	
NSHR																			1													NSHR	
BLJA																																BLJA	
BCCH							1	2								1		2	1			1										BCCH	
NRWS																																NRWS	
BANS																																BANS	
BARS																																BARS	
RCKI	1				1			1		1			1									1	1				2			3		RCKI	
GCKI															2						2					1						GCKI	
RBNU											1		1			1	1			1												RBNU	
TOWA									1																		1				1	TOWA	
VATH	1										1																					VATH	
GCTH																																GCTH	
SWTH							2	3	3	6	2	6	7	2	4	10	5	6	7	2	3	2	4	12	3	6	7	4	1	4	5	SWTH	
HETH	1																															HETH	
AMRO													1																				AMRO

Appendix 1: Monthly Summaries of Daily Standard Banding, Fall 2022, Mugaha Marsh

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Birds Banded by day in August																															
CODE	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
CEDW												1	1			2	1	2									1				
EVGR																															
PUFI		2			1						1		1																		
PISI		3	2		1		1	1	4	4			4		2										1						
CHSP															1																
CCSP																		1	1												
ATSP																															
FOSP																															
DEJU	0	0	0	0	0	0	0	0	1	0	0	3	0	0	0	1	0	0	0	0	0	1	2	0	0	1	2	1	2	0	0
UDEJ									1			3				1						1									
ORJU																					1	1				1	2	1	2		
WCSP	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GWCS																															
WTSP	4			1								1			1	1			1	1		3						2	1		
SAVS																					1						2				
SOSP			1																		1										
LISP											1		2						1						2						1
SWSP																															
OVEN			1							1													1	1	3						
NOWA	3		1		6	3	3	4	2	1	1	1	2	2	6	1	2	1		3	3	1					2		1		
BAWW													1																		
TEWA	3		1				1	1					1	1			1		1												
OCWA	2	2					1				1	1			5			3	1		3	3	5	3	4		2	4		2	
MGWA	1		1					4				1	2	1												1					
COYE	3				2			4	1		4		4		1					1		2	3		8	1			3		1
AMRE	8	6	5	3	6	3	23	8	3	6	6	17	17	14	4	23	9	8	11	1	2	4	9	6	4	4	3	3	1	1	2
MAWA	5	2	1	1	3		4	3	4	2	7	2	9	4	7	4		8	5		1	2		2	2	3		1		3	1
YEWA	1	3			3		1	1	2			1	3		3	2	1	1			1	1			2	2	1				
BLPW													1					1				1									1
YRWA	0	0	0	0	0	0	0	0	0	1	0	0	2	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0
UYRW										1			1					1												1	
MYWA																															
TRES																															
WIWA		2				1	2					2	2	1	1	1	1			1	1	2	1	2			1				
WETA													3			1		2													
Total	38	29	24	7	34	12	50	38	25	36	32	44	76	28	36	75	30	45	37	11	15	27	45	27	33	17	29	21	14	13	16
# species	17	17	14	7	16	9	18	18	14	16	18	18	27	12	16	21	15	22	17	10	11	16	18	11	16	8	18	11	11	9	12
Net Hours	72	70	58.5	9	68.5	24.5	63	72	72	71	72	72	72	48.5	61.5	61	72	72	72	72	71.5	72	72	71.5	72	72	58.3	45.5	61	50	72
Birds/net hr	0.53	0.41	0.41	0.78	0.50	0.49	0.80	0.53	0.35	0.51	0.44	0.61	1.06	0.58	0.59	1.23	0.42	0.63	0.51	0.15	0.21	0.38	0.63	0.38	0.46	0.24	0.50	0.46	0.23	0.26	0.22

Appendix 1: Monthly Summaries of Daily Standard Banding, Fall 2022, Mugaha Marsh

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Species	Birds Banded by day in September																							CODE
	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	
Sharp-shinned Hawk																								SSHA
Belted Kingfisher																								BEKI
Yellow-bellied Sapsucker																								YBSA
Red-breasted Sapsucker																								RBSA
Hybrid Sapsucker																								HYSA
Downy Woodpecker																								DOWO
Northern Flicker																								NOFL
Yellow-shafted Flicker																								YSFL
Flicker intergrade																								FLIN
Western Wood-Pewee																								WEWP
Yellow-bellied Flycatcher																								YBFL
Alder Flycatcher						1																		ALFL
Least Flycatcher	1	1			1																			LEFL
Hammond's Flycatcher	1	1			1				1			1												HAFI
Dusky Flycatcher					2		1										1							DUFL
Eastern Kingbird																								EAKI
Blue-headed Vireo																								BHVI
Warbling Vireo					1													1						WAVI
Red-eyed Vireo																								REVI
Northern Shrike																								NSHR
Blue Jay																1								BLJA
Black-capped Chickadee							1										2			2			1	BCCH
Northern Rough-winged Swallow																								NRWS
Bank Swallow																								BANS
Barn Swallow																								BARS
Ruby-crowned Kinglet	2	1	3	1	2	1	5	3	7	6	5	21	5	7	7	25	18	6	19	6	12	8	11	RCKI
Golden-crowned Kinglet						1	2	5	5			8	1	3	2					7	3	2	2	GCKI
Red-breasted Nuthatch											1	8				1								RBNU
Townsend's Solitaire	1																							TOWA
Varied Thrush												1												VATH
Gray-cheeked Thrush								1	1		1													GCTH
Swainson's Thrush	4	7	9		2	5	2	2	1	3		1	2			1			1			1		SWTH
Hermit Thrush										1		1	1			1			3				1	HETH
American Robin														1										AMRO

Appendix 1: Monthly Summaries of Daily Standard Banding, Fall 2022, Mugaha Marsh

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Species	Birds Banded by day in September																						
	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Cedar Waxwing																							
Evening Grosbeak																							
Purple Finch																							
Pine Siskin		1												1								21	
Chipping Sparrow						1																	
Clay-colored Sparrow																							
American Tree Sparrow									1				1	2								1	
Fox Sparrow							2	1															
Dark-eyed Junco	5	4	17	6	4	3	22	5	4	1	3	6	7	11	8	1	3	3	1	10	9	13	4
Unidentified Dark-eyed Junco			4			1	1	2			3		2		4		2	2			3	1	1
Oregon Junco	5	4	13	6	4	2	21	3	4	1		6	5	11	4	1	1	1	1	10	6	12	3
White-crowned Sparrow	1	1	1	0	1	0	1	3	1	1	1	3	0	4	1	0	0	0	0	0	0	0	0
Gambel's White-crowned Sparrow	1	1	1		1		1	3	1	1	1	3		4	1								
White-throated Sparrow		1	4		1	3	3	1	1		2	2			1	1					1	2	
Savannah Sparrow					1																		
Song Sparrow								1															
Lincoln's Sparrow	2			2			2							1							1		
Swamp Sparrow		1					1																
Ovenbird	1							1															
Northern Waterthrush																							
Black-and-white Warbler																							
Tennessee Warbler	1	1												1									
Orange-crowned Warbler	2	1	3	1	1	2	5	6		2	3	2	1	2	1	4					1		
MacGillivray's Warbler																							
Common Yellowthroat	5	8	2	1	4	1	1	2	2	1	2		5	6		2		1					
American Redstart	3	3	2	1		2	1	3		1	1		1						1				
Magnolia Warbler	1	1		3			1	1	2		1	1	1		1								
Yellow Warbler																							
Blackpoll Warbler																1	1						
Yellow-rumped Warbler	2	0	1	0	0	1	1		1	1		12	1		1	4		2		1			
Unknown Yellow-rumped Warbler	2		1			1	1		1	1		10	1		1	4		2					
Myrtle Warbler												2									1		
Townsend's Warbler																							
Wilson's Warbler	2	1	1		1	6	1					1		1								1	
Western Tanager																							
Total Individuals	34	33	43	15	22	27	52	35	26	17	20	68	26	40	22	42	25	13	25	23	28	26	44
# species	16	16	10	9	14	13	17	14	11	9	10	14	12	12	8	12	6	6	6	4	7	7	10
Net Hours	72	72	72	54	58	71	72	72	72	61.5	68	66	72	66	63.5	51	72	51.5	71.5	60	72	62	60
Birds per Net Hour	0.47	0.46	0.60	0.28	0.38	0.38	0.72	0.49	0.36	0.28	0.29	1.03	0.36	0.61	0.35	0.82	0.35	0.25	0.35	0.38	0.39	0.42	0.73

Appendix 2: Birds Banded in Standard Banding, 1995-2022, Mugaha Marsh

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Species ↓	1995 11 Aug - 24 Sep	1996 5 Aug - 28 Sep	1997 26 Jul - 26 Sep	1998 21 Jul - 20 Sep	1999 19 Jul - 19 Sep	2000 23 Jul - 24 Sep	2001 22 Jul - 23 Sep	2002 21 Jul - 22 Sep	2003 20 Jul - 21 Sep	2004 20 Jul - 22 Sep	2005 19 Jul - 22 Sep	2006 18 Jul - 23 Sep	2007 19 Jul - 23 Sep	2008 19 Jul - 23 Sep	code
Northern Harrier		1													NOHA
Sharp-shinned Hawk		7	1	1	2	2	1	4			2	3		2	SSHA
Cooper's Hawk				1											COHA
Sora			1											1	SORA
Western Sandpiper		1	1												WESA
Wilson's Snipe		5	3	1				4		1	1	1	4		WISN
Solitary Sandpiper		1													SOSA
Belted Kingfisher											1		1		BEKI
Yellow-bellied Sapsucker		2	1	5	2			5	1	15	4	9	4	2	YBSA
Red-naped Sapsucker								1							RNSA
Red-breasted Sapsucker		1	2	1	2	1	1		4	5			2	3	RBSA
Hybrid Sapsucker	1		3	6		1					7	5	3	6	HYSA
Downy Woodpecker		1	1	2	6	18	19		17	8	5	9	16	18	DOWO
Hairy Woodpecker		1		2	1	2	1	2	9	1		3	2		HAWO
American Three-toed Woodpecker									1	1			2		TTWO
Yellow-shafted Flicker			3	1	1				1		3			1	YSFL
Northern Flicker Intergrade			1	1	3	1			2	1		1	1	3	FLIN
Red-shafted Flicker		1		1	2	1	1		1						RSFL
Northern Flickers		1	4	3	6	2	1		4	1	3	1	1	4	NOFL
American Kestrel		1				1									AMKE
Merlin					1			1	1				1		MERL
Olive-sided Flycatcher			2											1	OSFL
Western Wood-Pewee	1	2	13	9	2	2		2	1	11	10	5	10	16	WEWP
Yellow-bellied Flycatcher	1	4	7	4	3	5	4	3	6	3	7	3	1	2	YBFL
Alder Flycatcher	23	87	138	93	77	99	74	52	110	192	179	32	119	50	ALFL
Willow Flycatcher															WIFL
Trail's Flycatcher															TRFL
Least Flycatcher	13	28	102	97	118	77	73	68	67	46	67	90	88	91	LEFL
Hammond's Flycatcher	13	25	57	41	51	67	74	64	69	52	52	47	43	35	HAFL
Dusky Flycatcher	5	18	35	24	30	17	26	17	41	38	34	20	13	26	DUFL
Pacific-slope Flycatcher					2	1				1			6		PSFL
Western Flycatcher		1	8	2	1			1	4	1					WEFL
Say's Phoebe				1											SAPH
Ash-throated Flycatcher														1	ATFL
Eastern Kingbird		5		2					6					3	EAKI
Northern Shrike												1			NSHR

Appendix 2: Birds Banded in Standard Banding, 1995-2022, Mugaha Marsh

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Species ↓	2009 19 Jul - 23 Sep	2010 17 Jul - 23 Sep	2011 19 Jul - 23 Sep	2012 19 Jul - 23 Sep	2013 19 Jul - 23 Sep	2014 19 Jul - 23 Sep	2015 19 Jul - 23 Sep	2016 18 Jul - 23 Sep	2017 19 Jul - 23 Sep	2018 19 Jul - 23 Sep	2019 19 Jul - 23 Sep	2021 19 Jul - 23 Sep	2022 19 Jul - 23 Sep	Totals 1995- 2022	code
Northern Harrier														1	NOHA
Sharp-shinned Hawk	2	4	1	2		1	1	3		3	1	6	2	51	SSHA
Cooper's Hawk														1	COHA
Sora														2	SORA
Western Sandpiper														2	WESA
Wilson's Snipe	1		1	3					1					26	WISN
Solitary Sandpiper														1	SOSA
Belted Kingfisher	1		1										1	5	BEKI
Yellow-bellied Sapsucker	5	7	13	6	12	13	8		1	6	3	3	5	132	YBSA
Red-naped Sapsucker														1	RNSA
Red-breasted Sapsucker			1			2	2					1	1	29	RBSA
<i>Hybrid Sapsucker</i>	3		1			1	3		1		6		1	48	HYSA
Downy Woodpecker	7	7	13	11	7	11	5		8	1	8	2	3	203	DOWO
Hairy Woodpecker	1	1		1	1	2	3	1	3	1				38	HAWO
Am. Three-toed Woodpecker		1												5	TTWO
<i>Yellow-shafted Flicker</i>		1		1									1	13	YSFL
<i>Northern Flicker Intergrade</i>			1		2	1				4	1		3	26	FLIN
<i>Red-shafted Flicker</i>					1									8	RSFL
Northern Flicker		1	1	1	3	1				4	1		4	47	NOFL
American Kestrel	1													3	AMKE
Merlin														4	MERL
Olive-sided Flycatcher			1			1		1						6	OSFL
Western Wood-Pewee	1	1	1				3	1	1				1	93	WEWP
Yellow-bellied Flycatcher	2	3	3	3	4	3	5	7	10	7	4	9	6	119	YBFL
Alder Flycatcher	55	54	55	49	107	99	130	122	90	62	93	81	59	2381	ALFL
Willow Flycatcher								1						1	WIFL
<i>Trail's Flycatcher</i>	1						1							2	TRFL
Least Flycatcher	104	82	84	95	156	139	178	70	94	49	46	60	73	2255	LEFL
Hammond's Flycatcher	60	73	41	31	66	80	82	22	34	26	62	19	30	1316	HAFL
Dusky Flycatcher	25	39	31	19	42	41	99	34	36	30	45	27	30	842	DUFL
Pacific-slope Flycatcher		1					4				1	2		18	PSFL
<i>Western Flycatcher</i>	1				4									23	WEFL
Say's Phoebe					1						1			3	SAPH
Ash-throated Flycatcher														1	ATFL
Eastern Kingbird	3							2					2	23	EAKI
Northern Shrike													1	2	NSHR

Appendix 2: Birds Banded in Standard Banding, 1995-2022, Mugaha Marsh

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Species ↓	1995 11Aug 24 Sep	1996 5 Aug - 28 Sep	1997 26 Jul - 26 Sep	1998 21 Jul - 20 Sep	1999 19 Jul - 19 Sep	2000 23 Jul - 24 Sep	2001 22 Jul - 23 Sep	2002 21 Jul - 22 Sep	2003 20 Jul - 21 Sep	2004 20 Jul - 22 Sep	2005 19 Jul - 22 Sep	2006 18 Jul - 23 Sep	2007 19 Jul - 23 Sep	2008 19 Jul - 23 Sep	code
Cassin's Vireo				9	5	1	4		5	15	4	3		4	CAVI
Blue-headed Vireo				1	4	1				2	4		1	2	BHVI
<i>Solitary Vireo</i>	2	6	10	9			1	3		7	6	4	3	1	SOVI
Philadelphia Vireo						1									PHVI
Warbling Vireo	13	51	61	76	77	49	25	35	33	44	63	40	59	26	WAVI
Red-eyed Vireo		3	7	5	3	5	8	11	8	6	3	1		1	REVI
Canada Jay	2	2	4	1			2								CAJA
Steller's Jay					1					1					STJA
Blue Jay															BLJA
Black-billed Magpie				1											BBMA
Northern Rough-winged Swallow			1											1	NRWS
Tree Swallow			3	2		3					3			1	TRES
Violet-green Swallow											1				VGSW
Bank Swallow			2	1											BANS
Barn Swallow			9	4		2					3	1		1	BARS
Black-capped Chickadee	17	18	16	92	20	101	33	22	64	76	14	23	24	71	BCCH
Mountain Chickadee														1	MOCH
Chestnut-backed Chickadee				1						1				4	CBCH
Boreal Chickadee		2	2			6				1		1			BOCH
<i>Hybrid Chickadee</i>													1	2	HYCH
Red-breasted Nuthatch		8	9	11	20	7	19	9	6	13		3	1	32	RBNU
Brown Creeper	4		1	2	1	1	1	2	5	4	1	5	3	4	BRCR
Pacific Wren								1	1			1	1	1	PAWR
Marsh Wren															MAWR
Golden-crowned Kinglet	3	15	19	122	55	62	50	49	102	60	55	74	38	113	GCKI
Ruby-crowned Kinglet	263	317	201	405	187	216	298	433	377	385	340	610	283	327	RCKI
Mountain Bluebird															MOBL
Townsend's Solitaire		1						1							TOSO
Gray-cheeked Thrush		1		2	1	4		3	2		1	1	1		GCTH
Swainson's Thrush	39	54	82	62	86	87	87	123	124	61	111	67	145	99	SWTH
Hermit Thrush	10	8	8	14	15	10	14	23	18	13	17	13	21	25	HETH
American Robin	3	6	17	31	18	10	1	30	19	9	12	7	17	10	AMRO
Gray Catbird															GRCA
Varied Thrush	1	4	1	2	3	1	2		12	3	2	2		4	VATH
European Starling															EUST
American Pipit															AMPI
Bohemian Waxwing					1					1		2			BOWA

Appendix 2: Birds Banded in Standard Banding, 1995-2022, Mugaha Marsh

Species ↓	2009 19 Jul - 23 Sep	2010 17 Jul - 23 Sep	2011 19 Jul - 23 Sep	2012 19 Jul - 23 Sep	2013 19 Jul - 23 Sep	2014 19 Jul - 23 Sep	2015 19 Jul - 23 Sep	2016 18 Jul - 23 Sep	2017 19 Jul - 23 Sep	2018 19 Jul - 23 Sep	2019 19 Jul - 23 Sep	2021 19 Jul - 23 Sep	2022 19 Jul - 23 Sep	Totals 1995- 2022	code
Cassin's Vireo	2	4		3	8	5	10	7	3	5	1	6		104	CAVI
Blue-headed Vireo							2	1			2		1	21	BHVI
<i>Solitary Vireo</i>	4	4		1										61	SOVI
Philadelphia Vireo											1			2	PHVI
Warbling Vireo	80	48	68	43	79	70	46	62	63	25	74	80	82	1472	WAVI
Red-eyed Vireo		1		2	12	9	1	2	4	2	1		5	100	REVI
Canada Jay				1	2	1					1	1		17	CAJA
Steller's Jay			1			1					1			5	STJA
Blue Jay					2								1	3	BLJA
Black-billed Magpie														1	BBMA
Northern Rough-winged Swallow				4			2			2			3	13	NRWS
Tree Swallow					2					3			4	21	TRES
Violet-green Swallow														1	VGSW
Bank Swallow								1		1			3	8	BANS
Barn Swallow			2	2									1	25	BARS
Black-capped Chickadee	18	33	28	31	28	73	23	25	15	27	90	20	17	1019	BCCH
Mountain Chickadee									1					2	MOCH
Chestnut-backed Chickadee									5			4		15	CBCH
Boreal Chickadee	2	1	1	3				11	1		1			32	BOCH
<i>Hybrid Chickadee</i>						1			1					5	HYCH
Red-breasted Nuthatch	4	10	4	12	1	1	2	8	11	5	3	5	15	219	RBNU
Brown Creeper		1	2		1	1	4	3		2	12	4		64	BRCR
Pacific Wren		1						2	1	1				10	PAWR
Marsh Wren								1						1	MAWR
Golden-crowned Kinglet	35	96	51	88	55	57	49	63	51	84	132	117	50	1745	GCKI
Ruby-crowned Kinglet	263	345	284	346	416	381	851	481	585	580	597	395	206	10372	RCKI
Mountain Bluebird			2											2	MOBL
Townsend's Solitaire			1							1		1		5	TOSO
Gray-cheeked Thrush	2	3	5	4	1	3	1	5		3	7	1	3	54	GCCH
Swainson's Thrush	119	124	190	187	257	302	196	201	152	154	277	238	206	3830	SWTH
Hermit Thrush	19	24	28	16	24	16	25	27	33	18	34	15	12	500	HETH
American Robin	19	18	44	14	29	45	17	10	7	21	27	9	11	461	AMRO
Gray Catbird											1			1	GRCA
Varied Thrush	1	2	4	2		1		3	2	2	8	4	3	69	VATH
European Starling						1					1			2	EUST
American Pipit		2					1	1			1			5	AMPI
Bohemian Waxwing				2										6	BOWA

Appendix 2: Birds Banded in Standard Banding, 1995-2022, Mugaha Marsh

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Species ↓	1995 11Aug 24 Sep	1996 5 Aug - 28 Sep	1997 26 Jul - 26 Sep	1998 21 Jul - 20 Sep	1999 19 Jul - 19 Sep	2000 23 Jul - 24 Sep	2001 22 Jul - 23 Sep	2002 21 Jul - 22 Sep	2003 20 Jul - 21 Sep	2004 20 Jul - 22 Sep	2005 19 Jul - 22 Sep	2006 18 Jul - 23 Sep	2007 19 Jul - 23 Sep	2008 19 Jul - 23 Sep	code
Cedar Waxwing		6	19	3	9	3		4	4	18	2	13	27	13	CEDW
Lapland Longspur			1			1									LALO
Ovenbird	7	2	3	4	4	6	6	3	13	8	8	4	7	7	OVEN
Northern Waterthrush	17	274	379	156	151	65	89	404	411	142	276	106	328	179	NOWA
Black-and-White Warbler			1												BAWW
Tennessee Warbler	3	2	13	20	13	2	26	40	42	14	16	33	7	6	TEWA
Orange-crowned Warbler	67	88	73	149	111	121	105	175	68	124	149	206	124	139	OCWA
Nashville Warbler															NAWA
MacGillivray's Warbler	1	20	27	31	31	17	27	33	31	20	34	31	23	19	MGWA
Mourning Warbler							1								MOWA
Common Yellowthroat	48	65	169	153	58	46	101	151	181	101	139	257	177	119	COYE
American Redstart	56	253	480	215	283	169	407	436	343	184	275	269	276	347	AMRE
Cape May Warbler															CMWA
Magnolia Warbler	19	55	66	48	48	30	66	106	70	64	84	89	82	92	MAWA
Bay-breasted Warbler														1	BBWA
Yellow Warbler	17	110	156	143	92	64	75	127	151	80	93	96	150	166	YEWA
Blackpoll Warbler	7	16	21	35	16	22	37	46	30	29	17	46	34	20	BLPW
Western Palm Warbler														1	WPWA
Myrtle Warbler	13	36	30	52	19	4	31	32	3	8	36	18	4	26	MYWA
Unknown Yellow-rumped Warbler	18	3	6	64	108	14	55	110	78	19	73	236	106	60	UYRW
Audubon's Warbler	42	29	32	49	54	20	28	33	30	18	33	52	17	27	AUWA
Yellow-rumped Warblers	73	68	68	165	181	38	114	175	111	45	142	306	127	113	YRWA
Townsend's Warbler	17	3	13	14	12	20	42	11	5	3	11	34	12	13	TOWA
Canada Warbler										1					CAWA
Wilson's Warbler	58	77	88	107	58	168	89	86	90	162	101	100	121	87	WIWA
Le Conte's Sparrow															LCSP
American Tree Sparrow	10	14	36	22	2	6	2	4	3	6	9	13	10	1	ATSP
Chipping Sparrow	2	11	7	16	18	49	19	10	15	12	4	11	11	13	CHSP
Clay-colored Sparrow		1	2	1						3			2	1	CCSP
Brewer's Sparrow			1	1	1					1			1		BRSP
Fox Sparrow	3	6	5	4	3	11	2	7	4	4	6	4	10	6	FOSP
Slate-colored Junco	6	1	9	5	4	7				7	2	1	3	2	SCIJ
Oregon Junco	70	82	79	57	74	70	44	75	33	57	144	164	44	16	ORJ
Unidentified Dark-eyed Junco	11	10	26	31	100	63	35	24	78	22	47	75	59	18	UDEJ
Dark-eyed Juncos	87	93	114	93	178	140	79	99	111	86	193	240	106	36	DEJU

Appendix 2: Birds Banded in Standard Banding, 1995-2022, Mugaha Marsh

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Species ↓	2009 19 Jul - 23 Sep	2010 17 Jul - 23 Sep	2011 19 Jul - 23 Sep	2012 19 Jul - 23 Sep	2013 19 Jul - 23 Sep	2014 19 Jul - 23 Sep	2015 19 Jul - 23 Sep	2016 18 Jul - 23 Sep	2017 19 Jul - 23 Sep	2018 19 Jul - 23 Sep	2019 19 Jul - 23 Sep	2021 19 Jul - 23 Sep	2022 19 Jul - 23 Sep	Totals 1995- 2022	code
Cedar Waxwing	27	33	21	29	31	148	46	20	7	8	37	24	22	574	CEDW
Lapland Longspur														2	LALO
Ovenbird	2	1	5	5	6	3	11	3	2	5	5	7	12	149	OVEN
Northern Waterthrush	119	29	89	431	106	81	96	141	90	77	62	154	80	4532	NOWA
Black-and-White Warbler					2							1	6	10	BAWW
Tennessee Warbler	16	14	131	118	256	160	180	103	75	23	12	28	26	1379	TEWA
Orange-crowned Warbler	163	179	177	301	224	189	218	193	221	177	145	189	111	4186	OCWA
Nashville Warbler								1						1	NAWA
MacGillivray's Warbler	32	16	14	21	31	30	22	32	15	13	22	17	11	621	MGWA
Mourning Warbler														1	MOWA
Common Yellowthroat	151	89	55	184	195	113	161	268	192	153	72	149	149	3696	COYE
American Redstart	186	138	160	296	225	160	183	391	341	258	189	270	321	7111	AMRE
Cape May Warbler				3				1						4	CMWA
Magnolia Warbler	93	81	75	112	108	73	78	102	95	105	53	130	119	2143	MAWA
Bay-breasted Warbler									1					2	BBWA
Yellow Warbler	67	70	131	168	73	59	64	115	84	80	56	82	73	2642	YEWA
Blackpoll Warbler	24	18	12	57	50	21	31	31	18	18	14	10	8	688	BLPW
Western Palm Warbler					1		1			3				6	WPWA
Myrtle Warbler	38	4	24	7	14	8	27	16	16	8	10	7	5	496	MYWA
Unknown Yellow-rumped Warbler	22	57	58	237	155	48	24	62	89	51	89	76	45	1963	UYRW
Audubon's Warbler	44	10	96	171	60	22	66	30	24	17	29	1		1034	AUWA
Yellow-rumped Warblers	104	71	178	415	229	78	117	108	129	76	128	84	50	3493	YRWA
Townsend's Warbler	7	12	16	41	13	10	13	13	11	8	18	12	4	388	TOWA
Canada Warbler														1	CAWA
Wilson's Warbler	65	80	43	53	32	46	69	118	77	129	105	68	43	2320	WIWA
Le Conte's Sparrow					1									1	LCSP
American Tree Sparrow	1	18			9	11	5	4	9	15	10		5	225	ATSP
Chipping Sparrow	4	26	15	18	10	5	9	10	3	2	17	4	6	327	CHSP
Clay-colored Sparrow	1	22	9	1	5	18	16	1	7	3	2		2	97	CCSP
Brewer's Sparrow		1					2							8	BRSP
Fox Sparrow	4	12	4	6	6	3	6	9	6	5	7	1	4	148	FOSP
Slate-colored Junco	2	1	5	1	1	10	4	12	5		4	3		95	SCIJ
Oregon Junco	39	61	134	55	145	93	67	75	55	62	104	5	132	2036	ORJU
Unidentified Dark-eyed Junco	20	65	33	64	45	41	30	61	35	41	49	99	39	1221	UDEJ
Dark-eyed Juncos	61	127	172	120	191	144	101	148	95	103	157	107	171	3352	DEJU

Appendix 2: Birds Banded in Standard Banding, 1995-2022, Mugaha Marsh

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Species ↓	1995 11 Aug - 24 Sep	1996 5 Aug - 28 Sep	1997 26 Jul - 26 Sep	1998 21 Jul - 20 Sep	1999 19 Jul - 19 Sep	2000 23 Jul - 24 Sep	2001 22 Jul - 23 Sep	2002 21 Jul - 22 Sep	2003 20 Jul - 21 Sep	2004 20 Jul - 22 Sep	2005 19 Jul - 22 Sep	2006 18 Jul - 23 Sep	2007 19 Jul - 23 Sep	2008 19 Jul - 23 Sep	code
<i>White-crowned Sparrow</i>	27	42	22			1			7					1	WCSP
<i>Gambel's White-crowned Sparrow</i>				31	31	56	59	52	10	34	26	41	32	17	GWCS
White-crowned Sparrows	27	42	22	31	31	57	59	52	17	34	26	41	32	18	WCSP
Golden-crowned Sparrow				2				1				1	1	1	GCSP
Harris's Sparrow		1													HASP
White-throated Sparrow	6	8	4	9	8	4	9	6	18	10	12	22	24	13	WTSP
Vesper Sparrow						1									VESP
Savannah Sparrow	3	21	30	46	25	35	23	11	4	16	11	23	14	14	SAVS
Song Sparrow	18	13	25	17	16	28	27	17	54	29	27	41	35	19	SOSP
Lincoln's Sparrow	17	19	33	20	57	53	50	11	38	48	24	66	39	18	LISP
Swamp Sparrow	3	2	3	11	2	5	3	2	5	3	1	13	2	3	SWSP
Western Tanager	4	6	11	26	10	6	1	12	29	16	10	12	15	9	WETA
Rose-breasted Grosbeak														1	RBGR
Red-winged Blackbird						2			1	2				2	RWBL
Brown-headed Cowbird			2	4	1	1	2	1	3	3		1	1	3	BHCO
Rusty Blackbird	3	1	5	7	4	1			2	4	2	8	8	6	RUBL
Common Grackle								1							COGR
Evening Grosbeak													1		EVGR
Purple Finch		3	5	7	4	4	2		2	1	2	5	6		PUFI
Cassin's Finch															CAFI
White-winged Crossbill					8								5		WWCR
Pine Siskin	14	95	85	1305	295	210	54	2	373	37	72	6	360	72	PISI
Total Number of Individuals	1001	2063	2799	4013	2531	2247	2336	3002	3346	2388	2758	3184	3092	2549	total
Total Number of Species	43	64	67	69	62	63	51	56	59	65	56	60	62	68	species
net hours	1851.5	3368	3979.5	4393.8	4314.8	3991.7	4326	4598	3709	4239.5	4396	4442.5	4256	4476.8	net hrs
Birds per net hr	0.5406	0.6125	0.7034	0.9133	0.5866	0.5629	0.5400	0.6529	0.9021	0.5633	0.6274	0.7167	0.7265	0.5694	Birds/net hr

In 1995, 1996 and 1997 the seasons were shorter and the number of nets were less than the standard 12 we use now.

In 2003 we did not band from Aug 18-21 and Aug 25-28 due to hiring new personnel; we had 13 nets all season that year.

Any non-standard banding birds recaptured in Standard Banding are counted in the totals as per station protocol.

In 1995, 1996 and 1997 totals include a small number of birds captured in a ground trap during the standard banding period.

Appendix 2: Birds Banded in Standard Banding, 1995-2022, Mugaha Marsh

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Species ↓	2009 19 Jul - 23 Sep	2010 17 Jul - 23 Sep	2011 19 Jul - 23 Sep	2012 19 Jul - 23 Sep	2013 19 Jul - 23 Sep	2014 19 Jul - 23 Sep	2015 19 Jul - 23 Sep	2016 18 Jul - 23 Sep	2017 19 Jul - 23 Sep	2018 19 Jul - 23 Sep	2019 19 Jul - 23 Sep	2021 19 Jul - 23 Sep	2022 19 Jul - 23 Sep	Totals 1995- 2022	code
<i>White-crowned Sparrow</i>	1	7	2	19	37	4		13	9	2	11			205	WCSP
<i>Gambel's White-crowned Sparrow</i>	37	31	64	49	19	32	52	84	8	40	45	21	19	890	GWCS
White-crowned Sparrows	38	38	66	68	56	36	52	97	17	42	56	21	19	1095	WCSP
Golden-crowned Sparrow	2	1	1					1	1					12	GCSP
Harris's Sparrow														1	HASP
White-throated Sparrow	17	27	78	108	138	101	69	126	59	95	110	45	58	1184	WTSP
Vesper Sparrow														1	VESP
Savannah Sparrow	15	73	36	20	2	12	29	8	9	39	41	6	4	570	SAVS
Song Sparrow	40	17	15	32	71	50	39	30	32	21	19	26	15	773	SOSP
Lincoln's Sparrow	38	23	66	30	101	70	85	48	42	45	31	21	37	1130	LISP
Swamp Sparrow	2	2	3	1	31	15	20	25	10	12	1	14	9	203	SWSP
Western Tanager	31	7	15	9	33	82	14	15	5	18	29	23	41	489	WETA
Rose-breasted Grosbeak									1	1	1			4	RBGR
Red-winged Blackbird	1				2					1		1		12	RWBL
Brown-headed Cowbird	5	1		3	1	3	2	4	2	1				44	BHCO
Rusty Blackbird	4	1	1	2	6	5			1	7	2			80	RUBL
Common Grackle														1	COGR
Evening Grosbeak													1	2	EVGR
Purple Finch	3	1	2	9	6	5	17	4	6	12	8	1	18	133	PUFI
Cassin's Finch							1							1	CAFI
White-winged Crossbill							2			7				22	WWCR
Pine Siskin	37	16	171	45	31	6	173	43	17	47	93		83	3742	PISI
Total Number of Individuals	2200	2236	2724	3688	3602	3099	3686	3391	2894	2734	3045	2605	2350	75563	total
Total Number of Species	58	63	59	58	60	58	60	62	58	62	62	52	61	114	species
net hours	4727.9	4794.8	4325	4494.25	4381.75	4596	4554.33	4447	4150.5	4454.5	4167.5	4072	4405.8	113914.43	net hrs
Birds per net hr	0.4653	0.4663	0.6298	0.8206	0.8218	0.6743	0.8093	0.7623	0.6973	0.6140	0.7311	0.6397	0.5334	0.6633	Birds/net hr

In 1995, 1996 and 1997 the seasons were shorter and the number of nets were less than the standard 12 we use now.

In 2003 we did not band from Aug 18-21 and Aug 25-28 due to hiring new personnel; we had 13 nets all season that year.

Any non-standard banding birds recaptured in Standard Banding are counted in the totals as per station protocol.

In 1995, 1996 and 1997 totals include a small number of birds captured in a ground trap during the standard banding period.

Appendix 3: New Birds Banded in Non-Standard Banding, 1995-2022, Mugaha Marsh

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Species	1994 25-26 Aug. 11-12 Sep.	1998 (5 nets) 16-23 May	1995 11 Aug - 24 Sep	1996 5 Aug. - 28 Sep	1998 21 Jul - 20 Sep	1999 19 Jul - 19 Sep.	2000 23 Jul - 24 Sep	2001 22 Jul - 23 Sep.	2002 21 Jul - 22 Sep	2003 20 Jul - 21 Sep	2004 20 Jul - 22 Sep	2005 19 Jul - 22 Sep	2006 18 Jul - 23 Sep	2007 19 Jul - 23 Sep	Code
Sharp-shinned Hawk		1													SSHA
American Kestrel					5										AMKE
Killdeer					1										KILL
Solitary Sandpiper															SOSA
Semipalmated Sandpiper							2								SESA
Least Sandpiper					1		5								LESA
Pectoral Sandpiper											2				PESA
Wilson's Snipe					6		2								WISN
Northern Pygmy-Owl															NOPO
Boreal Owl										2	11		1		BOOW
Northern Saw-whet Owl			17	1	1	2	1		29	84	53	8	106	50	NSWO
Calliope Hummingbird												4	2	3	CAHU
Rufous Hummingbird												4	5	4	RUHU
Belted Kingfisher		2													BEKI
Red-breasted Sapsucker	1														RBSA
Downy Woodpecker								1							DOWO
Yellow-shafted Flicker					1										YSFL
Alder Flycatcher	2	1					1	2							ALFL
Least Flycatcher	5	5			2		1	3							LEFL
Hammond's Flycatcher	3				2		11	1							HAFL
Dusky Flycatcher	1	2			1	2	1								DUFL
Eastern Kingbird					1										EAKI
<i>Solitary Vireo</i>					1										SOVI
Cassin's Vireo							1	1							CAVI
Blue-headed Vireo							1								BHVI
Warbling Vireo		2			2			1							WAVI

Appendix 3: New Birds Banded in Non-Standard Banding, 1995-2022, Mugaha Marsh

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Species	2008 19 Jul - 23 Sep	2009 19 Jul - 23 Sep	2010 17 Jul - 23 Sep	2011 19 Jul - 23 Sep	2012 19 Jul - 23 Sep	2013 19 Jul - 23 Sep	2014 19 Jul - 23 Sep	2015 19 Jul - 23 Sep	2016 18 Jul - 23 Sep	2017 19 Jul - 23 Sep	2018 19 Jul - 23 Sep	2019 19 Jul - 23 Sep	2021 19 Jul - 23 Sep	2022 19 Jul - 23 Jul	1994-2019, 2021-2022 Total	Code
Sharp-shinned Hawk															1	SSHA
American Kestrel															5	AMKE
Killdeer															1	KILL
Solitary Sandpiper	1														1	SOSA
Semipalmated Sandpiper															2	SESA
Least Sandpiper	1														7	LESA
Pectoral Sandpiper															2	PESA
Wilson's Snipe															8	WISN
Northern Pygmy-Owl							2			1					3	NOPO
Boreal Owl				1			11	5	2	1		6	2		42	BOOW
Northern Saw-whet Owl	2			7	39	15	50	51	55	30	33	55	108	109	906	NSWO
Calliope Hummingbird	3	11	1										2		26	CAHU
Rufous Hummingbird	9	21	4		4			1					4		56	RUHU
Belted Kingfisher															2	BEKI
Red-breasted Sapsucker															1	RBSA
Downy Woodpecker															1	DOWO
Yellow-shafted Flicker															1	YSFL
Alder Flycatcher															6	ALFL
Least Flycatcher															16	LEFL
Hammond's Flycatcher															17	HAFL
Dusky Flycatcher															7	DUFL
Eastern Kingbird															1	EAKI
Solitary Vireo															1	SOVI
Cassin's Vireo															2	CAVI
Blue-headed Vireo															1	BHVI
Warbling Vireo															5	WAVI

Appendix 3: New Birds Banded in Non-Standard Banding, 1995-2022, Mugaha Marsh

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Species	1994 25-26 Aug. 11-12 Sep.	1998 (5 nets) 16-23 May	1995 11 Aug - 24 Sep	1996 5 Aug. - 28 Sep	1998 21 Jul - 20 Sep	1999 19 Jul - 19 Sep.	2000 23 Jul - 24 Sep	2001 22 Jul - 23 Sep.	2002 21 Jul - 22 Sep	2003 20 Jul - 21 Sep	2004 20 Jul - 22 Sep	2005 19 Jul - 22 Sep	2006 18 Jul - 23 Sep	2007 19 Jul - 23 Sep	Code
Steller's Jay				4											STJA
Tree Swallow		1					1								TRES
Bank Swallow							2								BANS
Barn Swallow															BARS
Black-capped Chickadee	6						9								BCCH
Red-breasted Nuthatch					1										RBNU
Golden-crowned Kinglet	2				1										GCKI
Ruby-crowned Kinglet	50				7		15	1	1						RCKI
Mountain Bluebird					1										MOBL
Swainson's Thrush	3	4			1		2	1							SWTH
Hermit Thrush	3				1		2								HETH
American Robin		21					2								AMRO
Varied Thrush	1						1								VATH
American Pipit							14								AMPI
Cedar Waxwing						1		2							CEDW
Northern Waterthrush	1	13													NOWA
Tennessee Warbler					1		1	1							TEWA
Orange-crowned Warbler	9	5			1		11	1							OCWA
MacGillivray's Warbler		1						1							MGWA
Common Yellowthroat	6	8					4	1							COYE
American Redstart	4	6			1		10	30							AMRE
Magnolia Warbler	2	1					3	1							MAWA
Yellow Warbler	1	6			1		2								YEWA
Blackpoll Warbler	2	1			5										BLPW
Unk. Yellow-rumped Warbler		1			3		4								UYRW
Myrtle Warbler	3	4			7		2	1							MYWA
Audubon's Warbler	12	12			5		1		1						AUWA
Total Yellow-rumped Warblers	15	17			15		7	1	1						YRWA
Townsend's Warbler	5				1		2								TOWA
Wilson's Warbler	5	28			1		18								WIWA

Appendix 3: New Birds Banded in Non-Standard Banding, 1995-2022, Mugaha Marsh

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Species	2008 19 Jul - 23 Sep	2009 19 Jul - 23 Sep	2010 17 Jul - 23 Sep	2011 19 Jul - 23 Sep	2012 19 Jul - 23 Sep	2013 19 Jul - 23 Sep	2014 19 Jul - 23 Sep	2015 19 Jul - 23 Sep	2016 18 Jul - 23 Sep	2017 19 Jul - 23 Sep	2018 19 Jul - 23 Sep	2019 19 Jul - 23 Sep	2021 19 Jul - 23 Sep	2022 19 Jul - Sep 23	1994-2019, 2021-2022 Total	Code
Steller's Jay															4	STJA
Tree Swallow															2	TRES
Bank Swallow															2	BANS
Barn Swallow	4														4	BARS
Black-capped Chickadee															15	BCCH
Red-breasted Nuthatch															1	RBNU
Golden-crowned Kinglet															3	GCKI
Ruby-crowned Kinglet															74	RCKI
Mountain Bluebird															1	MOBL
Swainson's Thrush															11	SWTH
Hermit Thrush															6	HETH
American Robin															23	AMRO
Varied Thrush															2	VATH
American Pipit															14	AMPI
Cedar Waxwing															3	CEDW
Northern Waterthrush															14	NOWA
Tennessee Warbler															3	TEWA
Orange-crowned Warbler															27	OCWA
MacGillivray's Warbler															2	MGWA
Common Yellowthroat															19	COYE
American Redstart															51	AMRE
Magnolia Warbler															7	MAWA
Yellow Warbler															10	YEWB
Blackpoll Warbler															8	BLPW
Unk. Yellow-rumped Warbler															8	UYRW
Myrtle Warbler															17	MYWA
Audubon's Warbler															31	AUWA
Total Yellow-rumped Warblers															56	YRWA
Townsend's Warbler															8	TOWA
Wilson's Warbler															52	WIWA

Appendix 3: New Birds Banded in Non-Standard Banding, 1995-2022, Mugaha Marsh

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Species	1994 25-26 Aug. 11-12 Sep.	1998 (5 nets) 16-23 May	1995 11 Aug - 24 Sep	1996 5 Aug. - 28 Sep	1998 21 Jul - 20 Sep	1999 19 Jul - 19 Sep.	2000 23 Jul - 24 Sep	2001 22 Jul - 23 Sep.	2002 21 Jul - 22 Sep	2003 20 Jul - 21 Sep	2004 20 Jul - 22 Sep	2005 19 Jul - 22 Sep	2006 18 Jul - 23 Sep	2007 19 Jul - 23 Sep	Code
Savannah Sparrow	2	2			2		1								SAVS
Fox Sparrow	1														FOSP
Song Sparrow	2	3					4	3							SOSP
Lincoln's Sparrow	4	4					10	1							LISP
Swamp Sparrow	2						1								SWSP
White-throated Sparrow							1								WTSP
White-crowned Sparrow	4			1											WCSP
Gambel's White-crowned Sparrow					3		8								GWCS
<i>Total White-crowned Sparrow</i>	4			1	3		8								WCSP
Slate-colored Junco	1														SCJU
Oregon Junco	4			2	8		1	2							ORJU
Unidentified Dark-eyed Junco	2														UDEJ
<i>Total Dark-eyed Junco</i>	7			2	8		1	2							DEJU
Red-winged Blackbird		5			1										RWBL
Rusty Blackbird		1			2		2								RUBL
Brown-headed Cowbird		2					1								BHCO
Purple Finch		9													PUFI
Common Redpoll							1								CORE
Pine Siskin	1	5			25			9							PISI
Total Number of Individuals	150	156	17	8	103	5	162	64	31	86	66	16	114	57	Total Ind
Total Number of Species	29	27	1	4	32	3	38	20	3	2	3	3	4	3	#sp

Appendix 3: New Birds Banded in Non-Standard Banding, 1995-2022, Mugaha Marsh

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Species	2008 19 Jul - 23 Sep	2009 19 Jul - 23 Sep	2010 17 Jul - 23 Sep	2011 19 Jul - 23 Sep	2012 19 Jul - 23 Sep	2013 19 Jul - 23 Sep	2014 19 Jul - 23 Sep	2015 19 Jul - 23 Sep	2016 18 Jul - 23 Sep	2017 19 Jul - 23 Sep	2018 19 Jul - 23 Sep	2019 19 Jul - 23 Sep	2021 19 Jul - 23 Sep	2022 19 Jul - Sep 23	1994-2019, 2021-2022 Total	Code
Savannah Sparrow															7	SAVS
Fox Sparrow															1	FOSP
Song Sparrow															12	SOSP
Lincoln's Sparrow															19	LISP
Swamp Sparrow															3	SWSP
White-throated Sparrow															1	WTSP
White-crowned Sparrow															5	WCSP
Gambel's White-crowned Sparrow															11	GWCS
<i>Total White-crowned Sparrow</i>															16	WCSP
Slate-colored Junco															1	SCJU
Oregon Junco															17	ORJU
Unidentified Dark-eyed Junco															2	UDEJ
<i>Total Dark-eyed Junco</i>															20	DEJU
Red-winged Blackbird															6	RWBL
Rusty Blackbird															5	RUBL
Brown-headed Cowbird															3	BHCO
Purple Finch															9	PUFI
Common Redpoll															1	CORE
Pine Siskin															40	PISI
Total Number of Individuals	20	32	5	8	43	15	63	57	57	32	33	61	116	109	1686	Total
Total Number of Species	6	2	2	2	3	1	3	3	2	3	1	2	4	1	66	

Appendix 4: New Birds captured in Standard Banding, by Net, Fall 2022, Mugaha Marsh Page 1 of 2

Species/Net	03	09	11	12	17	19	20	21	22	25	26	32	U	Total	Species
ALFL	7	1	3	7	7	1	8	13	4	1	2	5		59	ALFL
AMRE	9	7	5	12	42	46	53	40	34	9	25	39		321	AMRE
AMRO	1		1	1				2	1	1	1	3		11	AMRO
ATSP				1	3				1					5	ATSP
BANS			3											3	BANS
BARS	1													1	BARS
BAWW							5		1					6	BAWW
BCCH	2			5	1	3	2	1		2		1		17	BCCH
BEKI							1							1	BEKI
BHVI												1		1	BHVI
BLJA					1									1	BLJA
BLPW	2			1			3	1				1		8	BLPW
CCSP	1						1							2	CCSP
CEDW	8			1	1	1	1	2	2	1	5			22	CEDW
CHSP	4		2											6	CHSP
COYE	20	6	31	44	7	8	7	10	4	2	9	1		149	COYE
DOWO										1	1	1		3	DOWO
DUFL	6	2	3	1	2		3	3			1	9		30	DUFL
EAKI	1			1										2	EAKI
EVGR	1													1	EVGR
FLIN	1	1										1		3	FLIN
FOSP	1				1					2				4	FOSP
GCKI	1	1	2	3	3	4	1	6	3	7	10	9		50	GCKI
GCTH						1	1				1			3	GCTH
GWCS			2	1		1			1	2	6	6		19	GWCS
HAFL	6	1	2	5	3		2	3		1	2	5		30	HAFL
HETH	3	1		1		2	2	2				1		12	HETH
HYSA										1				1	HYSA
LEFL	12	4	4	9	11	2	2	7	5	2	3	12		73	LEFL
LISP	4	3	9	11	1	1	1	2			1	3	1	37	LISP
MAWA	1	4	2	3	17	18	10	17	11	4	12	20		119	MAWA
MGWA	1	2		1				3			3	1		11	MGWA
MYWA	2				1					2				5	MYWA

Appendix 4: New Birds captured in Standard Banding, by Net, Fall 2022, Mugaha Marsh Page 2 of 2

Species/Net	03	09	11	12	17	19	20	21	22	25	26	32	U	Total	Species
NOWA	9	2	8	9	10	3	4	9	4	9	8	5		80	NOWA
NRWS	2		1											3	NRWS
NSHR				1										1	NSHR
OCWA	12	1	4	16	8	7	7	9	3	7	14	23		111	OCWA
ORJU	7	10	2	4	6	4	2	6	7	20	33	31		132	ORJU
OVEN		4			1		1	1	3		2			12	OVEN
PSI	34	1	7	7	1			1		1	8	23		83	PSI
PUFI	7		3	1					1		4	2		18	PUFI
RBNU	6			4							4	1		15	RBNU
RBSA					1									1	RBSA
RCKI	12	4	10	22	9	17	18	10	5	16	21	62		206	RCKI
REVI					1			1	3					5	REVI
SAVS			1	1		1						1		4	SAVS
SOSP	4	1	3	4		1					2			15	SOSP
SSHA					1				1					2	SSHA
SWSP			2	5		1					1			9	SWSP
SWTH		13	4	12	22	16	19	20	21	17	19	42	1	206	SWTH
TEWA	1		1	4	2	2	2	4	1	2	1	6		26	TEWA
TOWA					1			1				2		4	TOWA
TRES			4											4	TRES
UDEJ	4	1	2	1	2	1	3	6	1	3	6	9		39	UDEJ
UYRW	20		5	1	4			1		7	3	4		45	UYRW
VATH								1	1	1				3	VATH
WAVI	12	11	1	11	7	7	4	2	6	5	12	4		82	WAVI
WETA	5		3	2		4		1		2	8	16		41	WETA
WEWP					1									1	WEWP
WIWA	2	1	1	8	8	2	2	3	3	3	3	7		43	WIWA
WTSP		3	1	1	1	7	9	4	5	4	11	12		58	WTSP
YBFL	2				1			1	1		2			7	YBFL
YBSA	1	1									3			5	YBSA
YEWA	10		10	12	11	6	5	7	6	4	1	1		73	YEWA
Total	245	86	142	234	199	167	179	200	139	139	248	370	2	2350	Total
Net Hours	323.75	389.25	314	342.75	382.5	386.25	386.25	386.75	386.75	384.25	333	390.25	-	4405.75	Net Hours

Appendix 5: Returns, by Net, Fall 2022, Mugaha Marsh

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Species	/	Net #	11	12	17	19	20	21	22	25	26	3	32	9	Total	
Alder Flycatcher				1											1	ALFL
American Redstart						1		5			2		2		10	AMRE
Black-capped Chickadee											1				1	BCCH
Common Yellowthroat		2		1											3	COYE
Northern Waterthrush				1		1	1	1							4	NOWA
Orange-crowned Warbler							1				2				3	OCWA
Dark-eyed Junco (Oregon)										1				1	2	ORJU
Purple Finch				1								2			3	PUFI
Sharp-shinned Hawk					1										1	SSHA
Swainson's Thrush					1	1					1	1		2	6	SWTH
Yellow-rumped Warbler												1			1	UYRW
White-throated Sparrow				1							1		1	1	4	WTSP
Yellow Warbler						1	1			1		1			4	YEWA
			2	5	2	4	3	6	0	2	7	5	3	4	43	Total

Band Number	Species	Age	Sex	Date	Net	Time	Bander ID
Return from 2014							
2571-07856	Swainson's Thrush	HY	U	2014-07-29	19	6:15	CLB
		AHY	U	2016-08-17	25	9:15	CAS
		AHY	F	2017-07-21	9	5:30	DRF
		AHY	F	2017-07-31	9	8:15	SMC
		AHY	F	2022-07-19	9	11:00	KAS
		AHY	F	2022-07-21	3	9:00	ZJR
		AHY	F	2022-07-22	25	5:30	ZJR
		AHY	F	2022-07-23	3	8:30	ZJR
		AHY	F	2022-07-25	26	8:30	ZJR
Returns from 2017							
2741-77453	Swainson's Thrush	HY	U	2017-07-27	17	5:30	DRF
		AHY	F	2022-08-12	19	6:00	ZJR
2780-82191	Yellow Warbler	HY	U	2017-07-25	19	6:00	DRF
		AHY	F	2022-08-12	3	8:30	ZJR
Returns from 2019							
2591-76990	Purple Finch	AHY	F	2019-07-22	26	9:30	JK
		AHY	F	2022-07-29	12	8:15	LAT
2591-76992	Purple Finch	AHY	M	2019-07-26	19	9:30	HLM
		AHY	M	2019-07-30	26	6:15	JK
		AHY	M	2022-07-24	3	8:30	ZJR
2591-76996	Purple Finch	HY	U	2019-07-28	26	10:30	JK
		AHY	F	2022-07-25	3	9:30	LAT
2771-82292	White-throated Sparrow	HY	U	2019-07-22	26	6:00	HLM
		AHY	M	2022-07-20	32	5:30	ZJR
2771-82476	White-throated Sparrow	HY	U	2019-08-14	32	8:30	MLC
		AHY	F	2022-07-29	26	6:45	LAT
2771-82602	Swainson's Thrush	AHY	U	2019-08-24	25	12:00	BMD
		AHY	M	2022-07-19	3	5:30	LAT
2780-83855	Alder Flycatcher	AHY	U	2019-07-20	30	8:30	MLC
		AHY	U	2021-07-19	3	9:00	KAM
		AHY	U	2022-07-19	12	8:00	ZJR
		AHY	U	2022-08-01	20	7:45	KAS
2810-69571	Yellow Warbler	AHY	M	2019-07-31	32	7:45	JK
		AHY	M	2019-08-08	12	9:30	BMD
		AHY	M	2022-08-17	25	11:45	KAS
2860-09448	Orange-crowned Warbler	AHY	F	2019-07-22	11	6:30	JK
		AHY	F	2019-07-28	26	7:30	MLC
		AHY	U	2021-08-01	26	7:15	ZJR
		AHY	U	2022-07-20	26	9:30	LAT

Band Number	Species	Age	Sex	Date	Net	Time	Bander ID
Returns from 2021							
1513-16236	Sharp-shinned Hawk	HY	M	2021-08-27	17	6:30	ZJR
		SY	U	2022-07-23	17	5:30	LAT
2771-82823	Swainson's Thrush	AHY	U	2021-07-19	19	5:30	LAT
		AHY	U	2021-07-21	21	10:00	SJK
		AHY	U	2021-08-29	22	7:00	KAM
		AHY	U	2022-07-27	17	7:30	LAT
2771-82870	Swainson's Thrush	HY	U	2021-07-22	9	8:00	ZJR
		HY	U	2021-07-26	25	6:00	ZJR
		AHY	F	2022-07-19	26	5:30	ZJR
2771-82913	White-throated Sparrow	HY	U	2021-07-27	20	9:30	ZJR
		HY	U	2021-08-01	19	7:45	ZJR
2771-82963	White-throated Sparrow	HY	U	2021-08-02	22	11:45	LAT
		AHY	U	2022-09-10	12	8:30	KLL
2771-83044	Swainson's Thrush	AHY	U	2021-08-20	26	9:45	MB
		AHY	U	2022-07-19	9	10:30	LAT
2920-55425	Yellow Warbler	AHY	F	2021-07-19	12	6:00	LAT
		AHY	F	2022-07-23	20	7:00	ZJR
2920-55446	Dark-eyed Junco (Oregon)	AHY	F	2021-07-19	32	9:30	KAM
		AHY	U	2021-08-25	26	10:00	ZJR
		AHY	F	2022-07-26	25	11:00	LAT
2920-55449	Orange-crowned Warbler	HY	U	2021-07-19	21	10:00	ZJR
		HY	U	2021-07-22	12	8:30	ZJR
		HY	U	2021-07-24	17	7:30	ZJR
		AHY	F	2022-08-06	20	11:30	ZJR
2920-55474	Northern Waterthrush	AHY	U	2021-07-20	12	10:00	KAM
		AHY	U	2021-08-24	22	9:00	KAM
		AHY	U	2022-07-21	12	8:00	ZJR
		AHY	U	2022-07-28	12	7:45	ZJR
		AHY	U	2022-08-13	12	6:00	ZJR
		AHY	U	2022-08-16	22	7:45	KLL
2920-55479	Yellow-rumped Warbler (Audubon's)	AHY	M	2021-07-20	25	10:30	KAM
		AHY	M	2021-07-22	26	6:00	LAT
		AHY	M	2021-07-23	32	8:30	LAT
		AHY	M	2022-09-12	3	12:30	LAT
2920-55487	Northern Waterthrush	AHY	F	2021-07-21	21	8:00	ZJR
		AHY	U	2021-07-28	17	10:30	LAT
		AHY	U	2021-08-02	20	5:45	LAT
		AHY	U	2021-08-14	12	6:30	KAM
		AHY	U	2021-08-27	12	8:00	KAS
		AHY	U	2022-07-27	21	5:30	ZJR
		AHY	U	2022-08-08	22	8:00	LAT
		AHY	U	2022-08-25	19	7:00	KLL

Band Number	Species	Age	Sex	Date	Net	Time	Bander ID
Returns from 2021 (continuing)							
2920-55494	Black-capped Chickadee	AHY	F	2021-07-22	9	6:00	KAM
		AHY	U	2021-07-26	17	7:30	KAM
		AHY	U	2021-07-29	32	11:45	KAM
		AHY	U	2021-08-21	17	9:45	LAT
		AHY	U	2021-09-08	11	7:30	KAM
		AHY	F	2022-08-01	26	7:15	LAT
		AHY	U	2022-08-26	26	8:30	ZJR
		AHY	U	2022-09-10	32	7:30	KLL
		AHY	U	2022-09-16	26	10:45	KLL
2920-55539	Orange-crowned Warbler	HY	U	2021-07-24	12	8:00	LAT
		AHY	F	2022-07-19	26	6:30	LAT
		AHY	F	2022-07-24	11	11:00	ZJR
		AHY	F	2022-08-20	26	6:15	KLL
2920-55662	Dark-eyed Junco (Oregon)	AHY	F	2021-07-30	32	8:45	KAM
		AHY	F	2022-09-19	9	12:45	KAS
2920-55803	Northern Waterthrush	AHY	U	2021-08-10	22	8:00	ZJR
		AHY	U	2021-08-16	22	6:45	ZJR
		AHY	U	2022-08-12	20	6:30	ZJR
2920-55829	Common Yellowthroat	HY	U	2021-08-12	12	7:30	LAT
		AHY	M	2022-07-21	12	7:30	ZJR
2920-55898	Northern Waterthrush	AHY	U	2021-08-17	20	7:15	LAT
		AHY	U	2021-08-19	22	8:45	ZJR
		AHY	U	2021-08-22	22	11:15	ZJR
		AHY	U	2021-08-24	19	8:00	KAM
		AHY	U	2022-07-19	19	8:00	ZJR
		AHY	U	2022-08-09	21	8:00	LAT
		AHY	U	2022-08-18	22	6:15	ZJR
		AHY	U	2022-08-20	22	9:15	KLL
2920-55975	Yellow Warbler	AHY	M	2021-08-21	9	8:45	KAM
		AHY	M	2022-07-24	19	10:30	ZJR
2920-56271	Common Yellowthroat	HY	U	2021-09-10	11	7:00	LAT
		AHY	F	2022-07-19	11	8:00	ZJR
		AHY	F	2022-07-22	11	11:00	ZJR
		AHY	F	2022-09-01	12	8:45	JAR
2920-56304	Common Yellowthroat	AHY	M	2021-09-11	12	12:30	LAT
		AHY	M	2022-07-23	11	6:30	LAT
2930-18850	American Redstart	SY	M	2021-07-19	20	7:00	ZJR
		AHY	M	2022-09-01	21	7:45	LAT
2930-18852	American Redstart	SY	M	2021-07-20	19	6:00	LAT
		SY	M	2021-08-01	19	5:45	ZJR
		SY	M	2021-08-06	20	6:15	LAT
		AHY	M	2021-09-05	21	8:15	ZJR
		AHY	M	2022-09-01	21	7:45	LAT
		AHY	M	2022-09-02	22	7:15	ZJR

Band Number	Species	Age	Sex	Date	Net	Time	Bander ID
Returns from 2021 (continuing)							
2930-18868	American Redstart	AHY	F	2021-07-23	25	5:00	ZJR
		AHY	F	2021-07-29	32	6:15	KAM
		AHY	F	2022-09-05	21	8:45	ZJR
2930-18871	American Redstart	SY	M	2021-07-23	22	11:00	ZJR
		AHY	M	2022-08-25	21	7:00	KLL
2930-18926	American Redstart	ASY	M	2021-07-30	32	6:45	KAM
		AHY	M	2021-07-31	26	9:45	KAM
		ASY	M	2021-08-02	26	5:45	LAT
		ASY	M	2022-07-27	26	9:00	ZJR
2930-19213	American Redstart	AHY	M	2021-08-14	17	6:30	KAM
		AHY	M	2021-08-17	32	6:15	LAT
		ASY	M	2022-08-01	26	8:45	LAT
2930-19236	American Redstart	AHY	M	2021-08-14	19	11:00	KAM
		AHY	M	2022-08-30	21	9:45	JAR
2930-19243	American Redstart	HY	U	2021-08-15	17	8:15	KAM
		AHY	F	2022-09-01	32	12:15	JAR
2930-19333	American Redstart	AHY	F	2021-08-19	20	8:45	ZJR
		AHY	F	2022-07-29	19	5:45	ZJR
2930-19448	American Redstart	AHY	M	2021-08-27	3	7:00	ZJR
		AHY	M	2022-08-31	32	6:45	ZJR

Banders: BMD - Blair Dudeck; CLB - Courtney Berdan; DRF - Devin Fischer; HLM - Heather Meier; JAR-Jeannine Randall; JK - Janos Kovacs; KAM - Kristen Mancuso; KAS - Kalum Srochenski; KLL - Kirstin Lachance; LAT -Laura Tabbakh; MB -Marissa Boyde; MLC - Maya Longpre-Croteau; SJK - Sandra Kinsey; SMC - Sarah Chalmers; and ZJR - Zoe Roberts

Age Codes: HY - Hatch Year, AHY - After Hatch Year, SY - Second Year, ASY - After Second Year

Sex Codes: M - Male, F - Female, U - Unknown Sex

Appendix 7: All Returns, Fall, 1996 – 2022, Mugaha Marsh

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Species	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2021	2022	Total	Species
ALFL		6	3	3	1	2	3	4	2	2	1	1			1	1			2	2	2	3	3	3	2	1	48	ALFL
ALFL/LEFL																				1	1						1	ALFL/LEFL
AMRE	1	17	16	10	12	11	12	14	12	15	14	10	9	5	5	2	9	4	4	4	9	8	6	5	6	10	230	AMRE
AMRO			2					1	1				3	1	1								1				9	AMRO
BCCH	1		3	1	2	1		2	2		5	1	2	1	4	4	2	4	5				1	3		1	41	BCCH
CCSP																		2		1							3	CCSP
CEDW																				1					5		1	CEDW
COYE		1	4	2		1		1	5	1	2	4	1		2	3	1	1	10	3	4	5	11	4	1	3	70	COYE
DEJU	2	4	4	2	4	2	5	2	2	7	2	2	1	1	1	1		2	2	2	1				1	2	49	DEJU
DOWO							1			1	2	2	2	2			1				1						10	DOWO
DUFL								1		3										1	3			1			9	DUFL
GWCS																					1						1	GWCS
HAFL														1						1							2	HAFL
HAWO													2														2	HAWO
HETH							1															1	1				3	HETH
LEFL	1			3	2	2	2		1		1	2	1	1	1	1	1			1	2	1					23	LEFL
LEFL/DUFL		1																									1	LEFL/DUFL
LISP									1		1	1					1	3	2	4		1					14	LISP
MAWA									1	2	2					2	1		1		3			1			13	MAWA
NOFL				2	1						1		1														5	NOFL
NOWA	2	12	10	17	3	2	2	6	11	9	11	14	6	6	2		2	3	2		1	2	2		2	4	131	NOWA
OCWA		1	2	3	2		1	2		2	1	1	2	3	4	3	6	7	9	8	6	2	10	1	2	3	81	OCWA
PISI			2	1																							3	PISI
PUFI																										3	3	PUFI
RBNU												1															1	RBNU
RBSA									1																		1	RBSA
RCKI				1	1					1	1			1			2					1		1	1		10	RCKI
REVI				1			1	2	1	2								1									8	REVI
RUBL																		1									1	RUBL
SSHA			1																							1	2	SSHA
SOSP	2	3	4	2	1	2		2	4	5	4	4	2	1	3	4	5	4	8	7	4	8	3	2			84	SOSP
SOVI/CAVI	1			1	1				2	3	1	1									1		1				11	SOVI/CAVI
SWSP																							1				1	SWSP
SWTH						1	4	5	2	3	3	2	8	5	2	4	3	2	5	1	3	6	3	5	6	6	79	SWTH
TEWA																				1			1				2	TEWA
WAVI			3	1	1	1	1	2			2	1	3	1	1	1	3	2	1	5	4	1	1	4			38	WAVI
WETA								1	1			1	1	1	1							1					7	WETA
WTSP									1			1	1			3		1	3	2	4	5	3	1	1	4	28	WTSP
YBSA													1					1						1			3	YBSA
YEWAWA	1	5	4	12	7	5	1	8	10	8	6	8	11	3	7	2	4	5	6	4	6	4	3	1	2	4	137	YEWAWA
YRWAWA	2	2	5	2	1	2			3	1	2	1	1	1	1	1	2	2	2	4	4	2		1	1	1	38	YRWAWA
Total	10	53	64	64	38	32	34	53	60	64	64	57	57	31	36	28	40	40	63	53	59	51	50	35	25	43	1204	Total
NSWO											1	1					1										4	NSWO
NOPO																								1			1	NOPO