Monitoring Avian Productivity and Survivorship (MAPS) at Witty's Lagoon Regional Park 2022

Evening Grosbeak at Witty's Lagoon Regional Park, 2022.
Photo: Adam Ross.

Prepared by Jannaca Chick
Rocky Point Bird Observatory
Victoria, BC, Canada

Summary

2022 marked Rocky Point Bird Observatory's (RPBO) fourteenth consecutive year running the Monitoring Avian Productivity and Survivorship (MAPS) program at Witty's Lagoon Regional Park in Metchosin, BC.

Sampling was conducted between 6 June 2022 and 5 August 2022 (MAPS periods 4 to 10), for a total of seven sessions, one for each 10-day MAPS period. Ten mist nets were used to capture birds; mist nets were deployed, and birds extracted, banded and processed according to MAPS protocols (DeSante et al. 2021) developed for The Institute for Bird Populations (IBP). Each sampling day, detections of birds seen or heard were also recorded in accordance with the MAPS protocol. Breeding status was determined by observing the body condition of individuals while in the hand, by location of active nests, and by the formulae prescribed by IBP.

A total of 262 individuals of 31 species were banded, 59 birds of 12 species recaptured, and 9 birds were unbanded. A total of 330 individuals were processed. The top three species (newly banded) were Rufous Hummingbird (50), Song Sparrow (30), and Wilson's Warbler (21). Concurrently with banding procedures, 70 species were observed on site throughout the season. Of the total number of birds banded and recaptured, 62% were Hatch Year (HY). For new birds banded, the percentage of HY birds was 68%.

Observation highlights include Evening Grosbeaks seen and heard 16 and 25 July and RPBO's first capture of this species, an After Second Year female. A Western Kingbird was seen in a tree above Net 9 and is the first record for this species during our MAPS banding program.

The overall capture totals were 10% lower than 2021. This year the number of banded birds was only marginally lower than last year, and we had fewer recaptures.

Background

The Monitoring Avian Productivity and Survivorship (MAPS) Program was established in 1989 by The Institute for Bird Populations (IBP) in California, USA. The program was designed to standardize collection of demographic data (vital rates) of North American landbirds. Analyses of MAPS data provide critical information relating to landbird ecology that can be applied to conservation and management initiatives (IBP 2015).

The purpose of the MAPS project is to inventory breeding songbird populations using standardized methodology, and to record sightings of other species occurring at these locations to facilitate comparisons of populations and avian diversity at the site with those in similar habitats across North America. The data are submitted to Environment and Climate Change Canada (banding), Birds Canada (banding) and to The Institute of Bird Populations (banding, observation, breeding status, and habitat structure) to be made available to researchers and others.

MAPS data collection is a collaborative effort, comprised of a network of banding stations run by government agencies, non-government organizations, and individuals throughout North America. Rocky Point Bird Observatory (RPBO) staff and volunteers have collected data for MAPS since 2003. The southern Vancouver Island banding stations at Rocky Point and Royal Roads University served as RPBO's sampling sites until 2009, when Witty's Lagoon Regional Park was added and monitoring at Royal Roads was discontinued. In 2011, MAPS at Rocky Point was discontinued, and a second banding site began at Madrona Farm in Saanich, BC. Monitoring at Madrona Farm was discontinued after 2019. These four stations have provided data for individual "birds-in-the-hand" of over 200 species in previous monitoring years.

Witty's Lagoon is a 56-hectare estuarine area managed by the Capital Regional District (CRD), which purchased the land in the late 1960s from the Witty family. The area inland of the beach where RPBO banding operations are conducted was historically an agricultural site. CRD classifies Witty's Lagoon as a Regional Conservation Area, an area containing sensitive ecosystems that support rare or endangered plant and animal species, where recreational activities are limited to those that are minimally disruptive (CRD 2000).

As required by the CRD, an annual scientific research permit is obtained for this project at Witty's Lagoon Regional Park.

This summary report includes 2022 data collected at Witty's Lagoon. A second summary report has been prepared for our site at "Power To Be" on Prospect Lake, Victoria.

Site Description

The banding station at Witty's Lagoon is accessed via the stairs from the small parking area at the end of Witty Beach Road. It is in a disturbed riparian corridor in the southwest area of Witty's Lagoon Regional Park. There is a variety of native and introduced vegetation, including fruit trees. The surrounding area beyond the park is mainly rural residential development and agriculture. The banding area consists predominantly of temporarily flooded deciduous shrubland, where Nootka rose, Himalayan blackberry, European hawthorn, and grasses are abundant. On the east side of this habitat is the beach of the peninsula that contains the lagoon. Scotch broom dominates the vegetated portion here. The remaining habitat of the main banding area is mixed needle-leaved evergreen cold deciduous woodland, containing two forest subsets of Douglas-fir woodland and poplar grove (Figure 1).

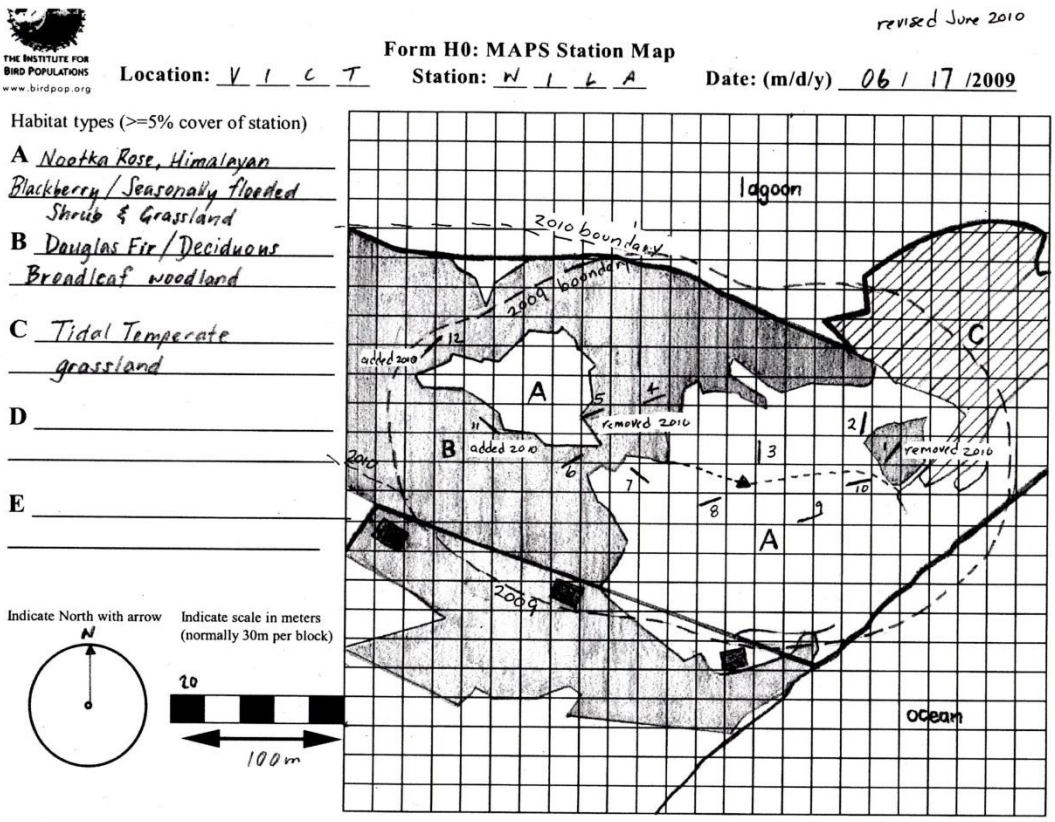

Figure 1. *Map of the Witty's Lagoon MAPS site with habitat structure types.*

Methodology

Methodology followed the MAPS Manual 2022 Protocol by which landbirds are captured in mist nets and banded during standardized sampling sessions. Sessions were conducted once in every ten-day period during the nesting season, from 6 June to 5 August. The safe handling and banding of birds followed the applicable sections of Rocky Point Bird Observatory's Field Protocol (RPBO 2008) and the MAPS Manual 2022 Protocol (DeSante 2022). A component of the RPBO protocol is the Bander's Code of Ethics developed by the North American Banding Council, which emphasizes bird safety over data collection (NABC 2018).

Each sampling session involved the use of ten mist nets (12m x 2.8m, with 30mm mesh size; Figure 2) for a six-hour period commencing at dawn. If necessary, nets were closed in poor weather if winds exceeding 15 km/h or if there was significant precipitation. Nets were checked every 30 minutes, or more frequently if weather conditions warranted. Captured birds were removed from the nets and taken to a central location for processing. Each bird was then identified to species, assigned an age class according to criteria compiled by Pyle (1997) and banded with an aluminum U.S. Fish and Wildlife leg band with a unique nine-digit number. A series of morphometric measurements was collected from each bird including wing chord,

stage of breeding development, amount of fat deposit, age of each feather tract, feather wear, and mass. Sex and age were determined, if possible, in accordance with criteria in the MAPS 2022 protocol. Date, time, and capture-net code were also recorded. Once processed, local-aged birds incapable of sustained flight were released near their capture net. Flocks of mixed ages captured simultaneously in the same net were released together to facilitate regrouping of family units.

Figure 2. *Map of the Witty's Lagoon MAPS site.*

Breeding status of each species encountered at Witty's Lagoon Regional Park was determined using multiple criteria. During the sessions, staff and volunteers observed bird behaviour and located evidence of breeding birds. A bird is considered a breeder at the site if clear evidence such as a nest or recent fledgling is found, but also if other related behaviours such as territorial singing or carrying food are observed over an extended period. Breeding status is not limited to a single session or season, but rather is determined by observations over all MAPS periods, late May to early August. Recapture of an adult bird more than seven days after original banding is used as an indicator that the bird is on breeding territory.

In 2019, the IBP suggested that MAPS stations use the Wolfe-Ryder-Pyle (WRP) method of aging birds in addition to the standard aging codes. In 2022, IBP added options and updated codes. RPBO has elected to use this method along with the regular aging codes since 2020.

In 2022, the COVID-19 pandemic guidelines were relaxed according to directives provided by the federal, provincial, and local governments to keep all participants safe and healthy. In 2020, RPBO created a COVID-19 Pandemic Protocol to accommodate all our banding programs. This

Protocol has been, and will continue to be, updated as necessary. This protocol is posted on our website: http://rpbo.org/Pandemic_Protocol.pdf. All our volunteers are asked to read and adhere to this protocol.

Warbler species banded at Witty's Lagoon Banding Station.
Photos: Christina Lam.

Results

2022 marked the fourteenth season of MAPS data collection at Witty's Lagoon. A total of seven sampling days were conducted between 6 June and 5 August (Table 1). This year there were two days of net closures. Rain on 3 June caused cancellation of the first scheduled day of MAPS banding which was rescheduled to 6 June. On 3 July, Period 7, nets were closed early due to rain, but the requisite number of net hours was achieved (more than half of a normal day's full operation). This resulted in a total of 405 net hours for the season. A total of 330 birds of 31 species were captured (Tables 1 and 2). This constitutes a 10% decrease of birds processed from 2021. The number of species banded was up from 24 in 2021. Some of the highlights were a Northern Rough-winged Swallow, an Evening Grosbeak, a Violet-green Swallow, an After Third Year Hairy Woodpecker, and ten Cedar Waxwings.

Table 1. Daily summary of 2022 mist net effort and total captures at Witty's Lagoon. New captures per net hour do not include repeat captures of the same banding day.

Date	New	Recaptured	Unbanded	Total	Net Hours	New per net hour
June 6	32	5	1	38	60.00	0.53
June 12	24	7	1	32	60.00	0.42
June 24	33	12	1	46	60.00	.55
July 3	52	9	3	64	45.00	1.16
July 16	54	12	1	66	60.00	0.88
July 24	24	4	0	28	60.00	0.40
August 5	43	10	2	55	60.00	0.72
Total	**262**	**59**	**9**	**330**	**405.00**	**0.65**

All birds that were handled were categorized as new bands, recaptures, or unbanded. Of the total captures, 79.6% were new birds acquiring a band, 18% were recaptures, having already been banded, and 2.4% were unbanded. Of the 59 recaptures, 20 were same day (34%). A total of 330 birds of 31 species were captured during this year's efforts and RPBO achieved an average of 0.65 newly banded birds per net hour (Table 1).

Table 2. Summary of 2022 captures by species and capture category at Witty's Lagoon. The top three species banded are highlighted in **bold**.

Species	New	Recaptured	Unbanded	Grand Total
American Goldfinch	2	0	0	2
American Robin	16	5	0	21
Anna's Hummingbird	10	0	1	11
Bewick's Wren	15	7	1	23
Brown Creeper	2	0	0	2
Bushtit	9	3	0	12
Chestnut-backed Chickadee	17	2	1	20
Cedar Waxwing	10	0	0	10
Common Yellowthroat	1	0	0	1
Dark-eyed (Oregon) Junco	1	0	0	1
Downy Woodpecker	3	0	0	3
Evening Grosbeak	1	0	0	1
Hairy Woodpecker	1	0	0	3
House Finch	2	0	0	2
MacGillivray's Warbler	3	2	0	5
Northern Rough-winged Swallow	1	0	0	1
Orange-crowned Warbler	16	5	0	21
Pacific Wren	1	0	0	1
Pacific-slope Flycatcher	8	0	0	8
Puget Sound White-crowned Sparrow	5	0	1	6
Purple Finch	12	4	0	16
Red-breasted Nuthatch	2	0	0	2
Rufous Hummingbird	**50**	2	4	56
Song Sparrow	**30**	20	2	51
Spotted Towhee	8	2	0	10
Swainson's Thrush	3	5	0	8
Violet-green Swallow	1	0	0	1
Warbling Vireo	3	0	0	3
Wilson's Warbler	**21**	1	0	22
Yellow Warbler	2	0	0	2
Yellow-rumped Warbler	1	0	0	1
Total	**262**	**59**	**9**	**330**

Of the total 59 birds recaptured, 30 were from previous years and 29 were same season. Of the 29 same season recaptures, 20 were same day. Nine birds were released unbanded, either due to escape or release by the handler because of signs of stress. There were two mortalities: a female Purple Finch that died due to stress-related factors, and an Anna's Hummingbird with a broken wing, due to extractor error, which was euthanized by Wild ARC Rehabilitation Centre.

Of the 262 banded birds, 179 (68%) were Hatch Year (HY), 22 (8.3%) were After Hatch Year (AHY), 44 (16.7%) were Second Year (SY), 18 (6.7%) were After Second Year (ASY), and 1 bird was aged After Third Year (ATY). The proportion of Hatch Year birds is consistent with previous years (Chick 2021; Chick 2020; Talluto 2019; Moore-Reid 2017, 2018).

Table 3. Proportion of birds by age at Witty's Lagoon in 2022. Recaptured includes same day.

Age	New	Proportion of new	Recaptured	Proportion of recaptured	Total proportion
HY	179	68%	18	30.5%	**61.4%**
AHY	22	8.3%	1	1.7%	**7%**
SY	44	16.7%	11	18.6%	**17%**
ASY	18	6.7%	29	49.2%	**14.6%**
ATY	1	.3%			

Northern Rough-winged Swallow.
Photo: Jannaca Chick.

Recapture highlights include: a male American Robin banded as SY in 2018 (now in its sixth year); seven Song Sparrows banded in 2020 (five aged as HY, one SY, one ASY); a male Orange-crowned Warbler banded in 2020 as HY was recaptured 3 times this year; a female Swainson's Thrush banded as a HY in 2021 was recaptured three times this year; a female Purple Finch banded as a SY in 2021 was recaptured twice in 2022; a male Purple Finch banded in 2021 as HY. For a complete 2022 recapture history from previous years, please see Table 4 below.

Table 4. Recapture history of bird captured at Witty's Lagoon in 2022.

Year banded	Recaptures (including banding date)	Species
2018	2 3 2	1 Chestnut-backed Chickadee (aged HY) 1 Bewick's Wren (aged HY) 1 American Robin (aged SY)
2020	2 10, 2, 3 2 5	1 Spotted Towhee (aged HY) 7 Song Sparrow (5 aged HY, 1 SY, 1 ASY) 1 American Robin (aged SY) 1 Orange-crowned Warbler (aged HY)
2021	4 2 3 5	1 Swainson's Thrush (aged HY) 1 American Robin (aged SY) 1 Bewick's Wren (aged HY) 2 Purple Finch (1 HY, 1 SY)

Since the start of the MAPS program at Witty's Lagoon in 2009, 89 species of birds have been observed on site. Of these, 20 species have been determined to be regular breeders, 23 are usual breeders (>1/2, not all years), 16 species are occasional breeders (<1/2 years), 21 transient (in breeding range, but not breeding at the MAPS site), 7 are migrant species (outside of known breeding range), and 2 are vagrant (Table 5).

Table 5. Breeding status of birds observed at Witty's Lagoon from 2011 to 2022.

Species	Breeding Status	Species	Breeding Status
American Crow	Usual	Hutton's Vireo	Usual
American Goldfinch	Usual	Killdeer	Occasional
American Robin	Breeder	Lesser Yellowlegs	Migrant
Anna's Hummingbird	Breeder	Mallard	Transient
Bald Eagle	Usual	MacGillivray's Warbler	Usual
Band-tailed Pigeon	Transient	Merlin	Transient
Barn Swallow	Transient	Mew Gull	Migrant
Barred Owl	Occasional	Northern (Red-shafted) Flicker	Breeder
Belted Kingfisher	Breeder	Northern Waterthrush	Vagrant
Bewick's Wren	Breeder	Northern Rough-winged Swallow	Occasional
Black-and-white Warbler	Vagrant	Olive-sided Flycatcher	Usual
Black-headed Grosbeak	Occasional	Orange-crowned Warbler	Breeder
Black Oystercatcher	Transient	Osprey	Transient
Brewer's Blackbird	Occasional	Pacific Wren	Occasional

Species	Breeding Status	Species	Breeding Status
Brown Creeper	Breeder	Pacific-slope Flycatcher	Breeder
Brown-headed Cowbird	Usual	Pileated Woodpecker	Occasional
Bushtit	Usual	Pine Siskin	Usual
California Gull	Migrant	Purple Finch	Breeder
California Quail	Breeder	Purple Martin	Transient
Canada Goose	Usual	Red Crossbill	Usual
Caspian Tern	Migrant	Red-breasted Nuthatch	Breeder
Cassin's Vireo	Transient	Red-breasted Sapsucker	Occasional
Cedar Waxwing	Breeder	Red-tailed Hawk	Transient
Chestnut-backed Chickadee	Breeder	Red-winged Blackbird	Usual
Chipping Sparrow	Occasional	Rock Pigeon	Transient
Cliff Swallow	Transient	Rufous Hummingbird	Breeder
Common Loon	Transient	Sharp-shinned Hawk	Transient
Common Raven	Usual	Short-billed Dowitcher	Migrant
Common Yellowthroat	Usual	Song Sparrow	Breeder
Cooper's Hawk	Occasional	Spotted Sandpiper	Transient
Dark-eyed (Oregon) Junco	Usual	Spotted Towhee	Breeder
Double-crested Cormorant	Transient	Swainson's Thrush	Breeder
Downy Woodpecker	Breeder	Tree Swallow	Transient
Eurasian Collared-Dove	Usual	Turkey Vulture	Transient
European Starling	Usual	Violet-green Swallow	Occasional
Evening Grosbeak	Transient	Warbling Vireo	Usual
Glaucous-winged Gull	Transient	Western Sandpiper	Migrant
Golden-crowned Kinglet	Usual	Western Kingbird	Transient
Great Blue Heron	Transient	Western Tanager	Usual
Greater Yellowlegs	Migrant	White-crowned (Puget Sound) Sparrow	Breeder
Hairy Woodpecker	Occasional	Willow Flycatcher	Occasional
Hammond's Flycatcher	Occasional	Wilson's Warbler	Breeder
House Finch	Usual	Yellow Warbler	Usual
House Sparrow	Occasional	Yellow-rumped Warbler	Occasional
House Wren	Usual		

Comments and Recommendations

The fourteenth year of the MAPS program at Witty's Lagoon saw a total of 330 birds processed. The species diversity (31) was higher than in 2021 (24). Rufous Hummingbird numbers remained stable with 50 banded in comparison to previous years: 47 (2021), 55 (2020), 51 (2019), 48 (2018). The number of Orange-crowned Warblers banded this year was double that of 2021. Wilson's Warblers were the third most numerous species banded. Purple Finches were breeding on site this year with males, females and juveniles banded and recaptured. Both Chestnut-backed Chickadees (CBCH) and Brown Creepers (BRCR) had a very successful breeding season in 2021; however, this year, their numbers were down considerably (CBCH 17 and BRCR 2). Six warbler species were banded at this location, many captured in our final session on 8 August; they were likely beginning their migration.

We continue to recapture breeding birds that return to this site, which provides valuable data. See Table 4 for recapture history.

Jannaca Chick & Mark Byrne examining an American Robin.
Photo: Robyn Byrne.

Capture rates were 0.65 birds per net hour (0.67 in 2021, 0.71 in 2020, 0.62 in 2019, 0.63 in 2018). The highest capture rate to date was 0.81 in 2017. This does not represent any kind of statistical analysis but is only for general interest in comparative bird numbers between 2022 and the last four years.

The MAPS protocol advises that a five to ten-year period of data collection is required before meaningful analysis can be initiated by IBP. It is evident that Witty's Lagoon provides habitat for a variety of breeding birds. Sufficient data has now been gathered at this site for trend analysis.

The MAPS program provides an excellent opportunity for new banders and volunteers to improve their skills. This year, due to a relaxation of our COVID-19 protocol, new volunteers were able to join us as scribe/helpers, net setup and takedown, and do some extractor training. This year, Mark Byrne worked to improve his banding skills, with the intent of obtaining a banding permit going forward.

Over the seven sessions, RPBO had 29 volunteers assist, which totaled 427.74 volunteer hours.

We had one group of visitors from the Victoria Natural History Society Saturday morning birding group at the Witty's Lagoon banding site.

Every effort should be made to continue the use of this site for the MAPS program.

Acknowledgements

This project would not have been possible without assistance from the Capital Regional District (CRD) and their staff.

In 2022, MAPS monitoring by Rocky Point Bird Observatory was conducted primarily by volunteers. Personnel include: MAPS Coordinator Cathy Reader, Volunteer Coordinator Robyn Byrne, and Bander-in-Charge Jannaca Chick (contractor); station setup and monitoring efforts were completed with the volunteer help of Melissa Anderson, Paige Banks, Kim Beardmore, Mark Byrne, Robyn Byrne, Jannaca Chick, Rebeca Dunn-Krahn, Aiden Fudge, Sonja Futehally, Sharon Godkin, Mara Hanneson, Kristine Heilmann, Christina Lam, Simone Littledale, Sultana Majid, Glen Milbury, Storm Morgan, Jo Motek, Mike Motek, Ann Nightingale, Aiva Noringseth, Heather Phillips, Carolyn Pullman, Cathy Reader, Emma Reader-Lee, James Reddick Adam Ross, Stephen Ross, and Olga Tkachenko.

Over 302.41 person hours of field work, plus 125.33 hours of setup and take down, total 427.74 volunteer hours for the 2022 MAPS season at Witty's Lagoon. This does not include administrative volunteer hours. Without everyone's generous donation of time, the season would not have been possible.

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Witty's Lagoon at sunrise.
Photo: Jannaca Chick.