STANLEY PARK ECOLOGY SOCIETY

Stanley Park Heronry Annual Report

2020 Season

Overview

Another Stanley Park heron nesting season has concluded with positive observations from this year's monitoring efforts. This is the 20th consecutive year the Great Blue Herons (GBHE) have returned to this location since 2001.

During this particularly extraordinary year, when human activity and visitation in Stanley Park much reduced due to COVID-19, it was important to conduct the surveys uninterrupted and consistently. Results that can be linked to these unique conditions can inform future management decisions for the conservation of this species.

2020's monitoring results (Table 1) are consistent with historical data and suggest that this location continues to provide viable nesting habitat.

Figure 1. *Caught in the act! A mating pair of herons in Tree Q in March 2020.*

(Photo: Frank Lin)

Table 1. *A summary table of results from this year's colony monitoring (details on page 3).*

# Total nests	**104**	Colony productivity (fledglings/nest)	**2.07**
# Active nests	**94**	Estimated total fledglings	**155**
Nest success rate	**80%**		

Background

We present a report on the heron colony (or "heronry") located near the Vancouver Park Board office. An area map of the nesting trees can be found in Appendix 1.

Pacific Great Blue Herons (*Ardea herodias fannini*) are protected under the *Migratory Birds Convention Act*, the BC *Wildlife Act*, and are designated as a Blue-Listed species (BC Ministry of Environment) and of special concern (COSEWIC). With nearly 80% of BC's Pacific GBHE found in and around the Fraser River Delta (COSEWIC, 2008), the productivity of this heronry has implications for the viability of the whole subspecies.

SPES has been actively involved in their monitoring and conservation since 2002, and our findings contribute to the regional efforts of many groups that study their local populations and are crucial to these birds' conservation. Nest productivity and nest success are key measures of the suitability of the Stanley Park colony's current location, for this year and years to come. Because herons are sensitive to disturbance in their immediate nesting area and feeding grounds within a 3-5 km radius (VPB, 2006), results from our monitoring may reflect changes in the quality of those habitats. Sharp drops and sustained negative trends to these measures may precede colony abandonment wherein the herons discontinue using this location in favour of another.

Monitoring Program

Methodology

Our methodology design was informed by GBHE survey protocols written for the Heron Working Group and similar organisations that research these herons (Vennesland, 2006).

From March to August, data was collected during 11 rooftop surveys, 4 ground surveys, and weekly monitoring of the Stanley Park Heron Cam. The Heron Cam was launched by the Vancouver Park Board (VPB) in 2015 and is used to supplement our observations from the rooftop and group surveys.

Up to April, we obtained the total nest count from ground surveys. After that, ground survey observations became limited due to growing tree foliage. Therefore, for the rest of the season, only a number of nests were visible from the rooftop; these visible nests are the "sample nests". Measures taken from the sample nests were used to infer results from the whole colony. For more details on our survey techniques, limitations, and results from the sample nests, please refer to Appendix 2.

Results

Timeline

The first heron sighted in the trees was in February 10 in Nest B2, which is noted as frequently the first nest which gets visited each season. We did not see any more interest in the nests until February 19, when individual males would come then leave again. The males did not congregate and settle in until February 24, which marked the first day of the colony's breeding season. Pairing and courtship began in late February, upon arrival of the female herons.

This year, instead of congregating on nearby rooftops to assess the area like they usually do, the herons alighted in the trees immediately.

Figure 3. *First male "scout" spotted this season in Nest B2. (Photo: Maria Morlin)*

The first eggs were laid on March 24, and the first hatchlings were recorded on April 23. Juveniles first started their "flight test" exercises on June 22, strengthening their wings for fledging, and the first fledges happened in the beginning of July. While Pacific GBHE chicks usually fledge after 60 days (or 8-9 weeks) from hatching (VPB, 2006), the fledglings in this colony have been found to leave later than average, at 10-12 weeks after hatching.

The nest with the last remaining chicks was EM11, which may have double-clutched after its first clutch failed. These chicks fledged by August 23. We detail this nest's timeline in Appendix 3, along with interesting observations around other notable nests.

Colony Counts

We counted a **total number of 104 nests** in 2020. In comparison, 106 were counted last year and 111 in average over the last 10 years.

We found that **36 out of 40 sample nests were active** (38/49 nests last year, average of 25/36 nests in the last 10 years). At the end of the season, we counted **66 fledglings in the sample**, compared to last year's 67 fledglings and the 10-year average of 54 fledglings.

Please refer to Table 2 in Appendix 4 for an outline of all results from this year's monitoring and details on how they were obtained.

Analysis

This year's **sample nest success increased to 80%** from last year's 69%. A nest is considered successful when it fledges one or more chicks, as opposed to failed nests that were occupied at one point but did not fledge any chicks. Nest success has been steadily increasing since a low point of 52% in 2017. The average productivity (number of fledged chicks per successful nest) in the sample increased this year at **2.07 fledglings/nest** compared to last year's 1.97 fledglings.

Active nests refer to all nests that are occupied at some point in the season, whether successful or failed. We estimate **94 active nests in the whole colony**, applying the sample nests' active rate to the total nest count taken from ground surveys. The 10-year average is 86 nests. Based on the count of fledglings and active nests in the sample, **we estimated 155 fledglings for the whole colony**. This estimate is a continued increase from the last two years and is higher than the 10-year average of 126 fledglings.

We note the limitations and assumptions from this study in Appendix 2, which gives necessary context when interpreting the results reported above. These results remain a valuable reference for the condition and long-term trends of the colony and the health of the local GBHE population.

Trends

This year's results add to a consistent (and favourable) trend of colony success over the past 20 years. Figure 4 presents the results since 2007, when SPES began doing rooftop surveys with our current methodology.

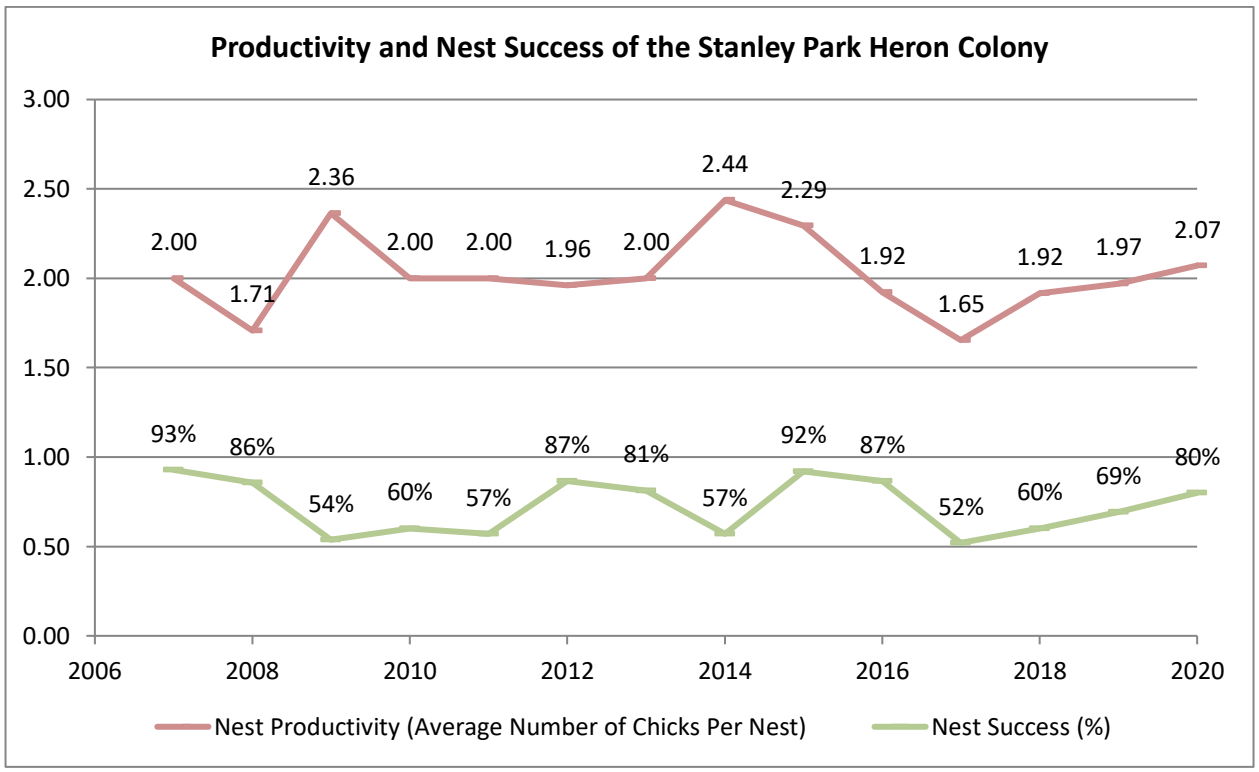

Figure 4. Productivity and nest success of the Stanley Park Great Blue Heron Colony (2007-2020).

There has been no significant change to nest productivity since 2007. **This year's outcome (2.07 fledglings) was higher than the historical average of 2.02 nestlings**. There is also no significant change to nest success, despite **this year's outcome (80%) also being higher than the historical average of 72%**. Results for nest success have fluctuated between 54% and 93% over the years. Change in predation rates from Bald Eagles may play a role in this. We note that most years with low nest success such as 2009, 2011, and 2014 have yielded high productivities (2.36, 2.00, and 2.44 respectively). This may suggest that heron families that successfully reared chicks when other families failed were able to sustain more chicks, possibly due to lower competition. This may be a natural result of finite resources in the colony's proximate feeding habitat, though measures for habitat quality are beyond the scope of this study. However, 2017 did not follow this pattern, when both nest productivity and success were both low, on a year of particularly high eagle predation through the season.

Figure 5 plots the estimates of active nests, total nests, and fledgling counts from 2007 to 2020.

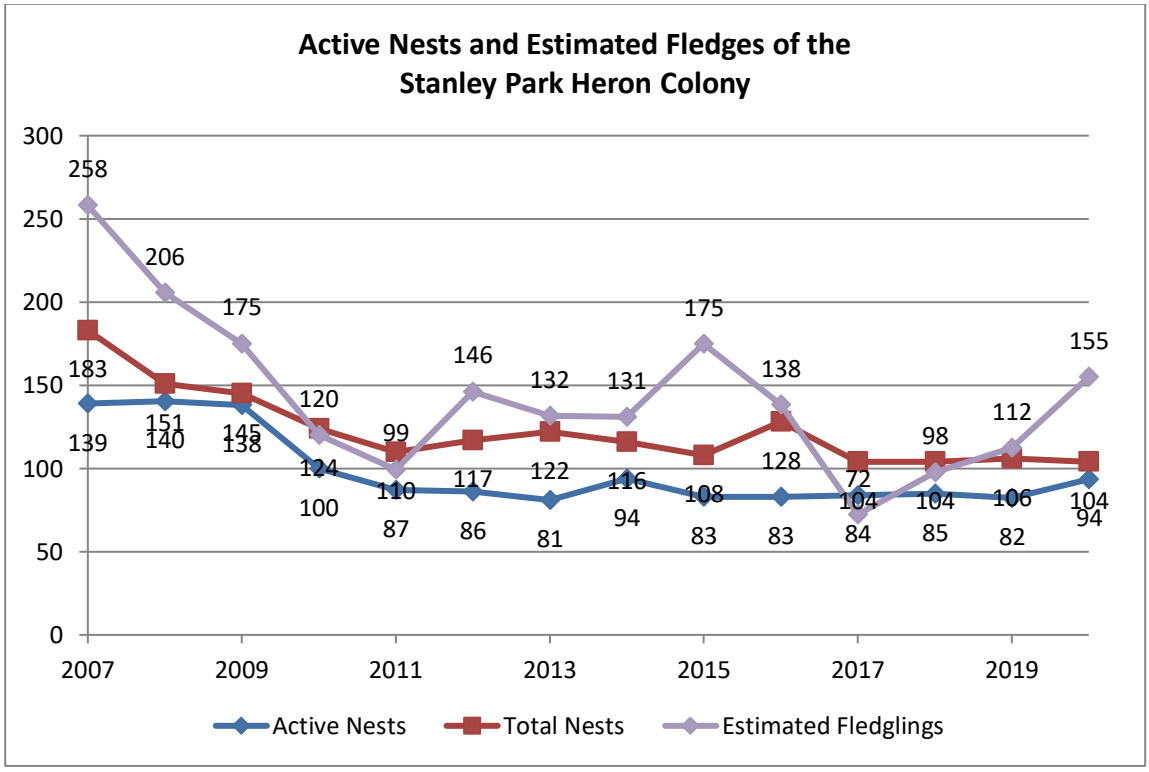

Figure 5. Active nests and estimated fledglings for the Stanley Park Great Blue Heron colony (2007-2020).

Active nest counts were at record highs between 2007 and 2009, which then stabilized to an average of 86 nests for the last 10 years. **This year's estimate of 94 is higher than the 10-year average**. It will be important to consistently measure active nests in the coming years to monitor trends in returning mating pairs.

The estimated number of fledglings results from the sample fledgling count and the rate of active nests and has been a more erratic number over the years. **This year's estimate of 155 fledglings is higher than the 10-year average of 125, compared to last year's 112.**

Environmental Factors

Raccoon Predator Guards

In 2010, SPES installed bands of metal flashing near the base of the nesting trees to block raccoons (*Procyon lotor*) from climbing up to prey on the heron eggs. The flashing continues to be effective; no raccoon attacks have been reported since the flashing installation.

In February, before the start of the breeding season, **SPES upgraded the metal flashing** by replacing duct tape with duct clamps for more durability and to allow for adjustment as the trees grow.

Eagle Predation

Bald Eagles (*Haliaeetus leucocephalus*) are one of the most considerable threats and stressors of heron colonies across the province. Both species' ranges overlap in coastal and riparian habitats, and both also overlap in their breeding season timing. The presence of eagles can affect the choice of location for heronries as well as fledgling success due to eagle predation on heron eggs and chicks (COSEWIC, 2008).

While **four (4) eagle mating pairs** successfully raised a total of **six (6) nestlings** in Stanley Park this year (SPES, 2020), eagle attacks were at a similar rate as last year. Late heron fledglings may have come from parents that double-clutched, possibly from eagle predation on their first clutch. Monitors observed that periods of highest eagle raid frequency were in early April (egg stage) and in late May (average chick age of 4-5 weeks). We received more frequent reports of eagle attacks this year from nearby residents, however, this may be influenced by stay-at-home guidelines in response to COVID-19, with more people observing these events from home.

Figure 6. *Image still of an eagle raid captured in April. Full video can be found here: https://youtu.be/GC7Ckou1uFo*

(Photo: Maria Morlin)

Surrounding Areas

We observed no incidents of commercial nor recreational operations proximate to the colony causing disturbance to the herons. We note that **generally decreased vehicle traffic and limitations to Park use between March 22 and June 22** created different conditions around human activity this year, and we hope to compare this year's results

with past and future years to analyse these impacts (if any) on the colony. Both the tennis courts and Stanley Park Brewing Restaurant & Brewpub were restricted between April and June, which reduced the number of visitors during the egg-laying and early chick-rearing period of the season. A lower level of Park visitation by foot continued through the season from local residents instead of tourists.

With this year's monitoring results falling within range of those of previous years, this suggests breeding success is not strongly affected by human activity around the Stanley Park colony. This colony appears to be very habituated to urban activity. We are interested in comparing this with next year's results should stay-at-home measures continue to limit public visitation.

Public Outreach

Public education and interpretative programming were identified as an integral component of the heronry's conservation management (VPB, 2006).

The installation of the **Vancouver Park Board Heron Cam** in 2015 allowed the story of the herons to be broadcast to a larger audience. The web camera was active 24/7 from February until late August, when nests visible to the camera no longer had any chicks. The web page allows viewers to control the camera for short periods of time by scrolling through different pre-defined views, and directs them to SPES' e-mail service for questions about the herons. Video clips and timelapses captured with the Heron Cam this year can be accessed through this link.

Due to COVID-19 restrictions placing most people at home, the **Heron Cam was exceptionally popular this year**. The stream garnered a spectacular reach of 90,011 total visits from 20,248 unique visitors in 2020 over a total view-time of 3245 hours. The Facebook livestream sessions we conducted (continuing from last year's pilot efforts) generated over 2,000 views each, with participants joining as far as Arizona and Wales, UK!

An unexpected negative outcome of the increased usage of the Heron Cam was a **decrease in streaming quality**, with the bandwidth serving the stream burdened by the multiple user firewalls. This significantly limited the smoothness and length of time users could view the Cam, and consequently discontinued the Facebook livestreams in May due to the bad connectivity. This meant a lost opportunity for high quality public engagement, which could be a concern if it remains an issue for future years.

Figure 7. *SPES volunteers in the EcoRanger program, manning the Heron Help Desk every Friday afternoon and throughout the week (Photo: Dannie Piezas/SPES)*

Continuing from the last two years' success, SPES—with support from the Park Board—offered **live, in-person, weekly interpretation at the colony**. This year, to increase outreach opportunities in a safe yet engaging manner, we incorporated heron outreach into SPES' EcoRanger program. This program trains and deploys small teams of interpreter volunteers in Stanley Park for every day of the summer season, to interact with and visitors and interpret the Park's ecosystems. EcoRangers directly engaged with over 400 people (our largest count yet!) over 19 tabling sessions in July and August. Visitors enjoyed the education service and the chance to see the herons, interacting with physical distancing measures in place. Compared to previous' year's audience of tourists from around the globe, locals and Canadians comprised the majority of our interactions this year.

SPES also led **two online webinars for the public** focused on the heron colony in June and in August, drawing 78 participants.

Acknowledgements

Figure 8. *SPES staff volunteers who gamely continued heron surveys through this year's challenges. From left to right: Frank Lin, Dannie Piezas, and Maria Morlin (Photo: Dannie Piezas/SPES)*

We would like to thank our **volunteers** for their efforts in counting Great Blue Herons through the year—in all kinds of weather and through a world-changing pandemic. Without their help, the data for this report (and our continued heron conservation work) would not exist. Frank Lin continued to contribute observations of fascinating heron behaviour and several high-quality images through the season, . We thank Rachel Foster who captured and curated Heron Cam images and clips with interesting behaviour. We also particularly thank Maria Morlin for her invaluable support in carrying out these surveys solo, during the most acute stage of the COVID-19 response.

Thank you to the **Vancouver Park Board** for their support of the colony through the online Heron Cam and the promotional efforts of their Communications team. Their efforts have allowed thousands of people from all over the world to connect with nature and view these magnificent birds.

We are deeply grateful to the **36 Adopt a Heron Nest donors** of the 2020 season. These contributions go directly towards monitoring the herons and raising awareness about this species at risk. We welcome new adopters through the year and invite you to visit our website to learn more and apply!

Lastly, we thank everyone who comes out to the colony to enjoy and learn about these birds. We wish the fledglings well this winter, and await the colony's return in 2021!

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References

[COSEWIC] Committee on the Status of Endangered Wildlife in Canada. 2008. COSEWIC assessment and update status report on the Great Blue Heron fannini subspecies Ardea herodias fannini in Canada. Ottawa. vii + 39 pp. (www.sararegistry.gc.ca/status/status_e.cfm)

[SPES] Stanley Park Ecology Society. 2020. Stanley Park Bald Eagle nest update 2020. Internal Document.

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Appendices

Appendix 1: Area map and nesting trees

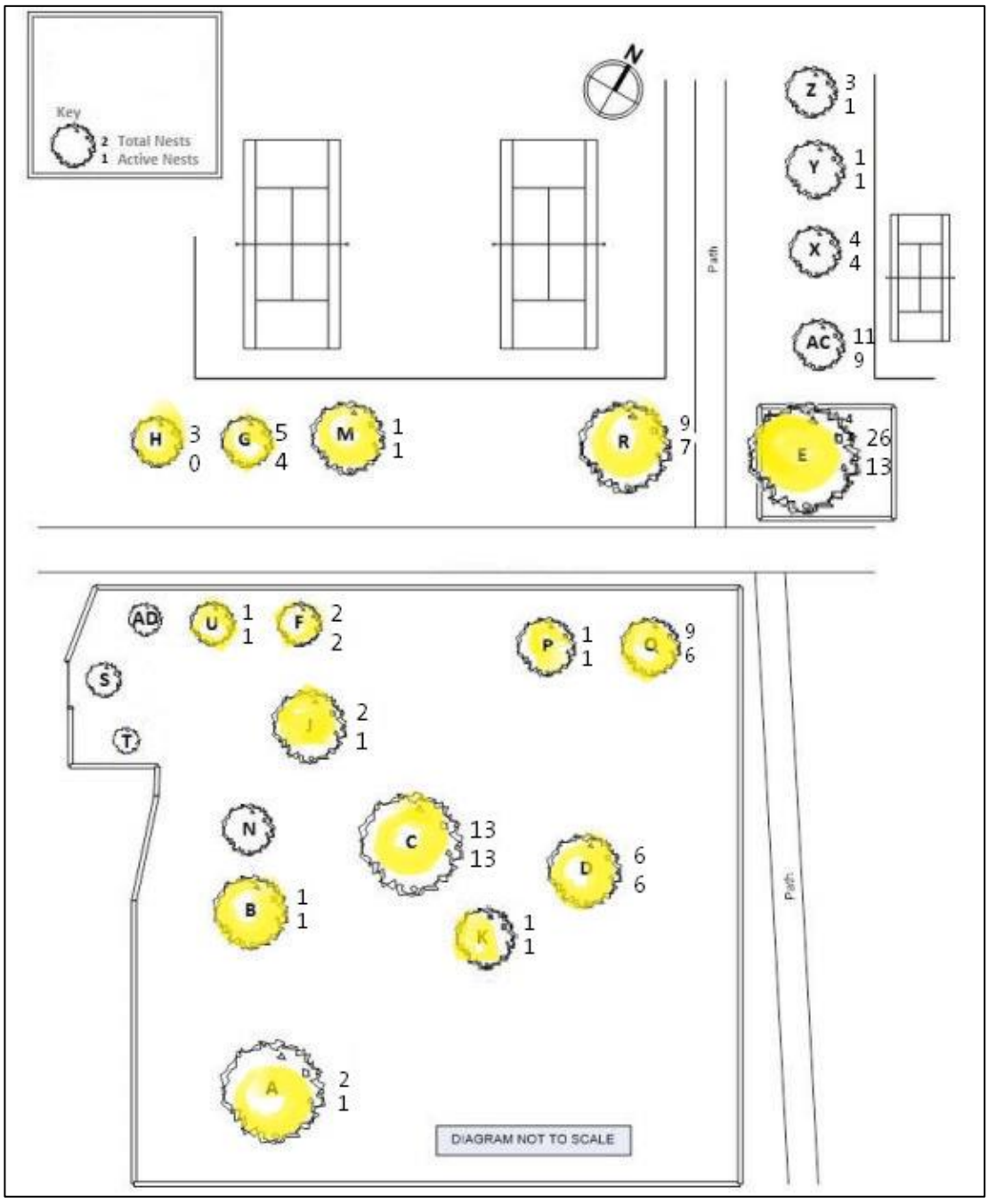

Figure 9. *Map of the Stanley Park heron colony layout with nesting trees labelled. Trees with sample nests are highlighted yellow. Number of active and total nests in this figure were recorded at the last ground count (April 8, 2020) and do not include all results from rooftop surveys; they should be considered the minimum confirmed nest counts.*

Appendix 2: Survey methods and limitations

Rooftop surveys (which gave us visual access to the sample nests) were conducted every two weeks. Sample nests were chosen for their observability from the rooftop all season, even after leaves filled out in the tree canopy. We started by counting every nest we could, then ruled out any nests that were hidden as the foliage grew. Many of our results are derived from data collected from rooftop surveys, assuming that the sample is representative of the whole colony.

Figure 10. *Monitors enjoying the view on a rooftop survey in 2019. (Photo: Dannie Piezas/SPES)*

Ground surveys were conducted every two weeks until May, when we reduced the frequency to once a month due to foliage growth, which greatly reduced visibility. These ground surveys were the best opportunity to count all nests throughout the colony, including the ones not visible from the rooftop.

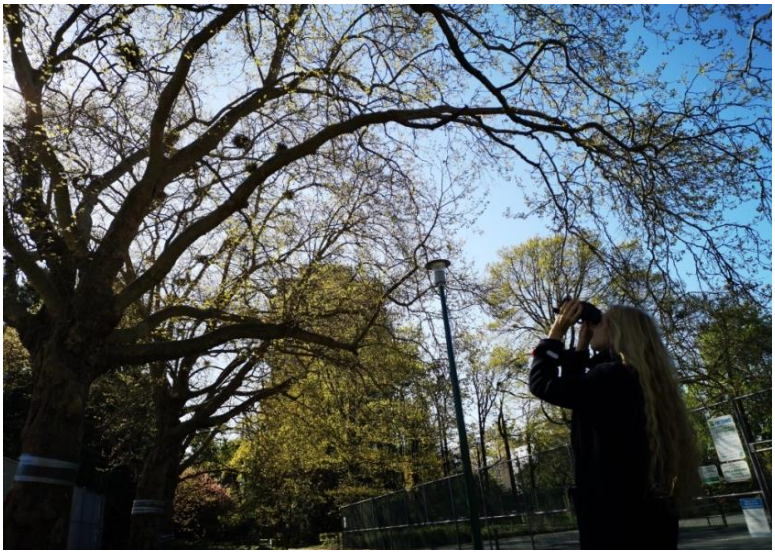

Figure 11. *Volunteer Julie Emerson undertaking the ground survey in 2019. (Photo: Dannie Piezas/SPES)*

Heron Cam monitoring was done almost daily in 30-minute sessions to follow the timeline of individual nests and capture detailed behaviour. Eleven (11) camera views afforded extended observation into 20-40 nests (this number changed through the season, also due to foliage growth).

Figure 12. Two nests with eggs in Tree J, photographed in late April from the Heron Cam. (Photo: Heron Cam/Vancouver Park Board)

Survey Limitations

We note the survey limitations we face each year, which give necessary context when interpreting the figures reported in this report.

Sample nests were chosen for their visibility through the season, from proximity to rooftop vantage and lack of foliage concealment. Foliage growth greatly limited our ability to choose samples randomly, despite random sampling being the ideal for this study. We chose to sample all observable nests in the interest of having the largest possible sample size (and therefore more data gathered), despite possible factors that affect the selected nests' representativity of the whole colony. For example, **the sample nests could be more susceptible to predation** because of their higher visibility. These samples nests are often the same each year due to their position, however, some of these nests fall or are dissembled while new ones are built elsewhere.

Fledgling counts are assumed between surveys. After chicks reached 10 weeks, we considered them as fledged if they were gone between one survey and the next. This introduces some probability that chicks counted as fledged may not have survived (e.g. fell from the nest, predated by eagles). We partly mitigated this by recording the number of dead, fallen chicks collected by Park Board staff during the fledging period.

While these limitations are present in our study, this colony continues to provide some of the best collected datasets of Pacific GBHE due to easy access. We are able to run these surveys with high frequency through the season, and the results provide some indication of regional trends, especially when compared with results from other colonies along the Georgia Strait.

Figure 13. *As the season progresses, it becomes increasingly difficult to see nests and their inhabitants due to foliage cover. (Photo: Frank Lin)*

Appendix 3: Nests of note

Tree K, Nest 1

- This is the only nest in the colony built in a coniferous tree. It is fairly easy to follow the success of this family due to the nest's season-long visibility from both the rooftop and Heron Cam.
- This family was right on-schedule with the others, producing hatchlings in late April and four (4) visible chicks in early May. These chicks grew to healthy sizes except for one that stayed significantly smaller than its siblings, which likely hatched from the last egg laid. This chick was often seen being pecked at by its siblings, commonly observed among heron chick siblings especially when competition for food is high. This chick disappeared by May 25, which likely meant it had fallen out of the nest.
- The day after the May 26 rooftop survey, when we had counted three (3) 5-week old chicks, Nest K1 showed as empty on the Heron Cam. It was very likely that an eagle had raided this nest overnight.
- This pair did not double-clutch after the chicks disappeared.

Figure 14. *Nest K1, with one parent and three huddled little hatchlings at five weeks old. Photographed on May 25th. (Photo: Heron Cam/Vancouver Park Board)*

Tree E, Nest M11

- This nest also produced its first clutch of chicks at the same time as the others, producing 2 young that reached 9 weeks of age by mid-June.
- To our surprise, we found that there were younger chicks on the July 7 rooftop survey, at approximately 3 weeks. This implied a new clutch of chicks that hatched soon after the disappearance of the older ones, likely resulting from an eagle raid.
- These chicks stayed on in tree E until mid-August, when they finally joined the other fledglings from the colony.

Figure 14. The remaining chicks in EM11, photographed in early August. (Photo: Frank Lin)

Appendix 4: Data tables

Table 2. Number of nests and fledglings at the Stanley Park heron colony in 2020. We indicate the measures' definitions and surveys they are sourced from.

Measure	Definition	Result
Total nests	A total count of all nest structures in the trees, both active and inactive. We used the highest number of the season recorded on April 16, before tree foliage started to obstruct visibility. (*Source: Ground survey)*	104
Sample total nests	Total number of nests surveyed from the rooftop, both active and inactive, that remained observable through the whole season. (*Source: Rooftop survey)*	40
Sample active nests	Number of nests within the sample total that were occupied by a mating pair. Not all active nests successfully produced young. (*Source: Rooftop survey)*	36
Sample successful nests	Number of sample nests that successfully reared young to the fledging stage. (*Source: Rooftop survey)*	32
Sample fledgling count	Number of fledglings assumed to have survived the nesting season and flown their nests. *(Source: Rooftop survey)*	66

Table 3. Sample success rate, sample productivity, number of active nests, and estimated total fledglings at the Stanley Park heron colony in 2020. We indicate the measures' definitions and how they were calculated.

Measure	Definition	Result
Sample nest success rate	Percentage of nests in sample that successfully produced young. (*Sample successful nests / Sample total nests)*	80%
Sample nest productivity	The average number of fledglings produced per successful nest. (*Sample fledgling count / Sample successful nests)*	2.07
Active nests	The number of nests in the whole colony that were assumed as occupied by a mating pair (whether successful or not). [*(Sample active nests * Total nests) / Sample total nests]*	94
Estimated fledglings	The estimated number of fledglings from the whole colony which now contribute to the regional population of GBHE. [*(Sample fledgling count / Sample total nests) * Active nests]*	155