

Stanley Park Heronry Annual Report

2019 Season

Overview

Another Stanley Park heron nesting season has wrapped up with interesting and positive observations from this year's monitoring efforts. This is the 19th consecutive year the Great Blue Herons (GBHE) have returned to this location since 2001.

This season, less eagle attacks were observed on the colony than last year. New nests were built in trees that were less used compared to previous years, and trees that have been used the longest are housing reduced numbers of nests than when the heronry first established. This shows a dynamic colony responding to the quality of its nesting habitat, with some of the trees showing signs of declining health. Some fledglings left their nests as late as mid-September.

The colony's results in 2019 (Table 1) are consistent with historical data, and suggest that this location continues to be viable nesting habitat.



Figure 1. A day in the life of heron parents—swapping bread-winning and child-minding duties to raise increasingly demanding chicks!

(Photo: Frank Lin)

Table 1. A summary table of results from this year's colony monitoring.

# Total nests	106	Colony productivity (fledglings/nest)	1.97
# Active nests	82	Estimated total fledglings	112
Nest success rate	69%		

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

Data was collected from 13 rooftop surveys, 7 ground surveys, and daily monitoring of the Stanley Park Heron Cam. The Heron Cam was launched by the Vancouver Park Board (VPB) in 2015 and has been used to supplement our observations from the rooftop and group surveys.

We obtained the total nest count from the ground surveys and recorded counts from sample nests visible from the rooftop. Measures taken from the sample nests were used to infer results from the whole colony. For more details on our survey techniques, their limitations, and results from the sample nests, please refer to [Appendix 2](#).

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

Results

Timeline

Winter temperatures persisted unto March, and the herons delayed their arrival until conditions better suited them. Previous colony records would show the herons arriving by mid-February, with the earliest recorded date being January 15. Males started perching in nearby trees and rooftops on March 9, and they began roosting overnight on March 10, within two days of the arrival dates of the last two years.

Pairing and courtship began soon after as the females arrived, and their bill duels and courting vocalisations competed with the sounds around the tennis courts below.



Figure 3. First egg spotted this season, from a nest in Tree B. (Photo: Heron Cam/Vancouver Park Board)

The first eggs were sighted on March 29, and the first hatchlings were recorded on April 28. Juveniles first started their “flight test” exercises around mid-June, strengthening their wings for fledging, and the first fledges happened in the beginning of July. While GBHE fledglings usually leave after 60 days or 8-9 weeks from hatching (VPB, 2006), the fledglings in this colony did not take off until 10-12 weeks after hatching.

Two nests, each with two chicks (likely from second clutches), remained until they fledged in mid-September, which is an unusually late end for the Stanley Park colony’s season.

We highlight some interesting observations we made on three notable nests in [Appendix 3](#).

Colony Counts

We counted a **total number of 106 nests** in 2019. In comparison, 104 were counted last year and 104 in average over the last 10 years.

We found that **38 out of 49 sample nests were active** (24/40 nests last year, average of 25/36 nests in the last 10 years). At the end of the season, we counted **67 fledglings in the sample**, compared to last year's 46 fledglings and the 10-year average of 51 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 69%** from last year's 60%. The average productivity (number of fledged chicks per successful nest) in the sample had a slight increase this year at **1.97 fledglings/nest** compared to last year's 1.92 fledglings.

We estimate **82 active nests in the whole colony**, applying the sample nest success rate to the total nest count taken from ground surveys; this is comparable to the 10-year average of 87 nests. Based on the count of fledglings and active nests in the sample, **we estimated 112 fledglings for the whole colony**. This estimate is a continued increase from the last two years and is closer to the 10-year average of 122 fledglings.

The Deer Lake GBHE colony, a nearby urban heronry with very similar challenges to Stanley Park's, was assessed in 2018 to have reared between 1.1-1.2 fledglings per nest, with a total of 80 nests and an estimated 53 fledged chicks (AquaTerra, 2018). Because access to this colony is more difficult than Stanley Park's, their survey frequency and methods are slightly different to ours.

We note the limitations and assumptions from this study in [Appendix 2](#), which give necessary context when interpreting the results reported above. These results are a valuable reference for the condition of the colony and potentially the health of the local GBHE population, despite our estimates being subject to some survey error which we have minimised as much as possible. Using analyses from long-term trends and colony averages to assess the colony may be more reliable than making inferences from the yearly results.

Trends

This year's counts suggest trends that are consistent (and therefore favourable) in the colony's breeding success over the years.

Figure 4 presents the results for the last 13 years. SPES began doing rooftop surveys with our current methodology in 2007, so we only analyse data from 2007 to the present.

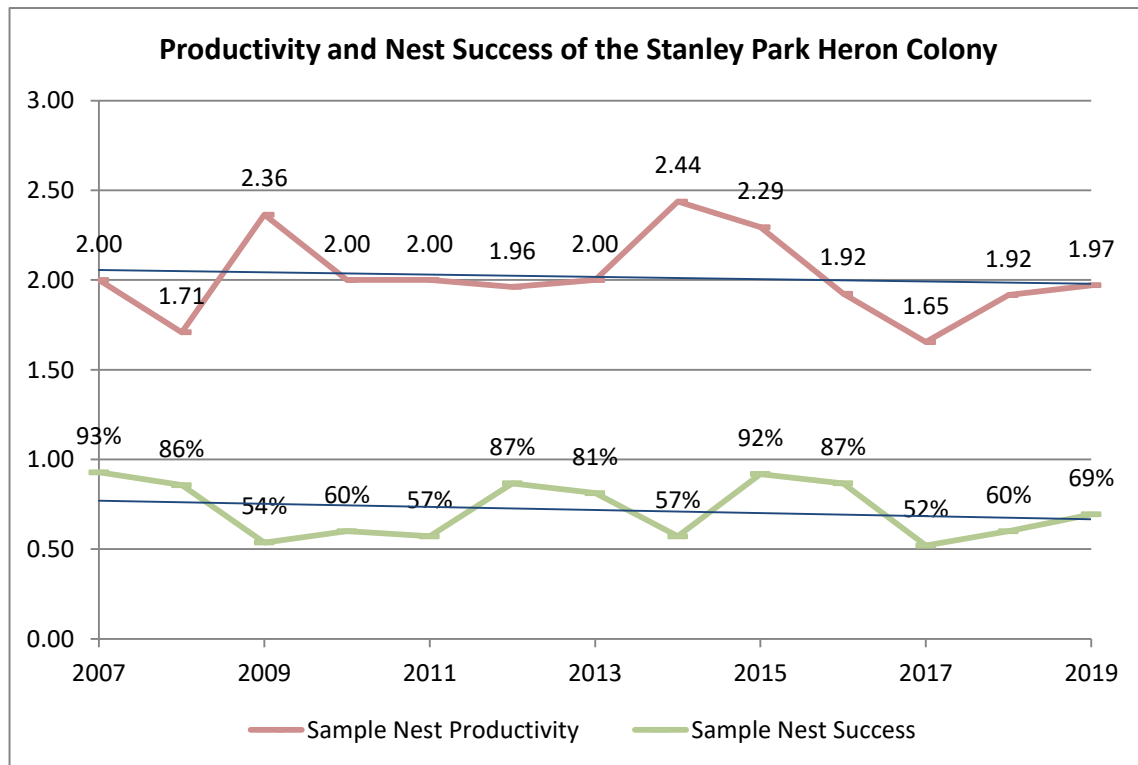


Figure 4. Productivity and nest success of the Stanley Park Great Blue Heron Colony, 2007-2019.

Overall, there is slight downward trend to nest productivity, though **this year's outcome (1.97 fledglings) stayed close to the historical average of 2.02 nestlings.** There is also a slight downward trend to nest success, with **this year's outcome (69%) coming close to the historical average of 72%.** Results for nest success have been quite variable over the years, but **results for nest productivity have tended to counter results for nest success.** For example, in 2009 and 2014, productivities were high at 2.36 and 2.44 respectively, while the success rates were low at 54% and 57%. This implies that some heron families were able to successfully rear more chicks when

other families failed (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 capacity of this study. One exception to this pattern is in 2017 when both nest productivity and success were both extremely low, on a year of particularly high eagle predation through the season.

Figure 5 plots the estimates of active nests and fledgling counts from 2007 to 2019.

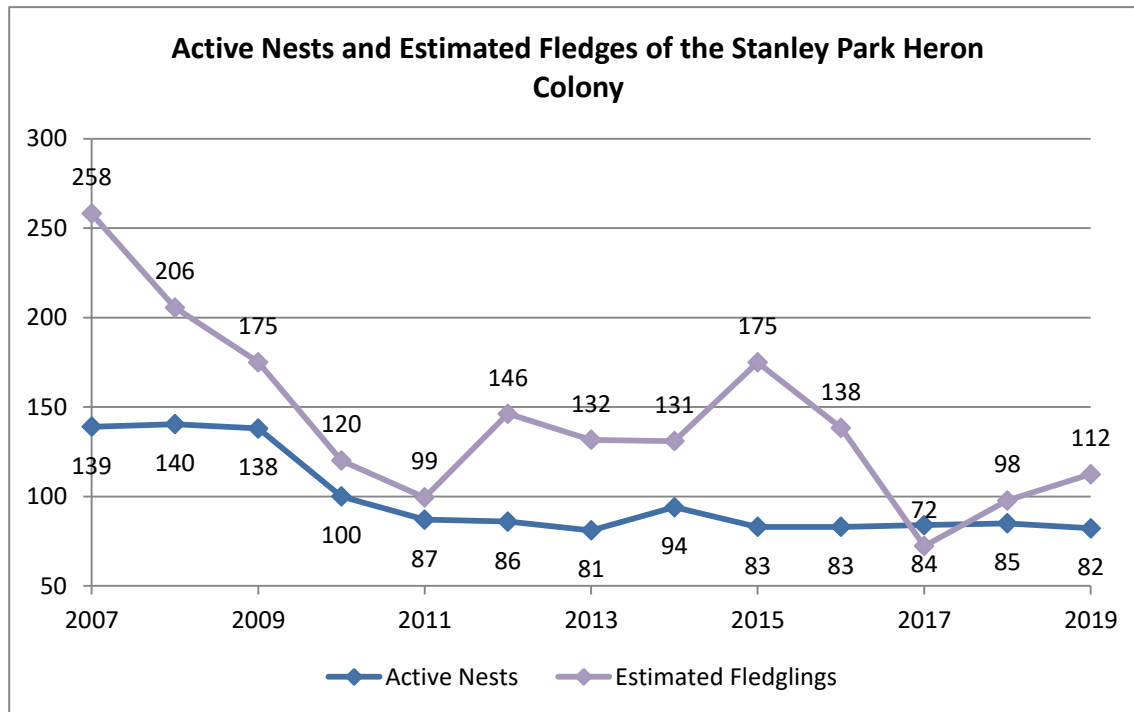


Figure 5. Active nests and estimated fledglings for the Stanley Park Great Blue Heron colony (2007-2019).

Active nest counts were at record highs between 2007 and 2009, which then stabilized to an average of 87 nests for the last 10 years. **This year's estimate of 82 nests remains near this average.** It will be important to continue monitoring this number in the coming years to see if a downward trend persists.

The estimated number of fledglings has been a more erratic number over the years. Because it is calculated from the sample fledgling count, sample total nest count, and active nests, any change in these results can lead to pronounced variation in the results. In future reports, we will aim to document confidence intervals around these estimations for each year's range of likely fledges. **This year's estimate of 112 fledglings is closer to the 10-year average of 122, compared to last year's 98.**

Environmental Factors

Raccoon Predator Guards

In 2010, SPES installed bands of metal flashing near the base of the nesting trees to remove access to raccoons (*Procyon lotor*), which can climb up to prey on the eggs. The flashing continues to be effective; no raccoon attacks have been reported since their installation and are no longer a predation risk for the eggs or nestlings.

We intend to reinstall some of the flashing before the next breeding season starts to accommodate the continuous growth of the trees.

Eagle Predation

Bald Eagles (*Haliaeetus leucocephalus*) are one of the most considerable threats and stressors of heron colonies across the province. Both species overlap in their preference for 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 the devastating impact eagles can incur in pursuit of easy prey like heron eggs and chicks (COSEWIC, 2008).

While **three (3) eagle mating pairs** successfully raised a total of **five (5) nestlings** in Stanley Park this year (SPES, 2019), eagle attacks were not as frequently observed as last year. Late heron fledglings this year may have come from parents that double-clutched, possibly from eagle predation on their first clutch. Monitors found that eagles exhibited a different behaviour around the colony than previous years, by flying in and out of the area quickly or just doing fly-bys. Previously, eagles would perch and observe from nearby trees for hours.



Figure 2. Eagle attack on Tree B, captured in April 2018. (Photo: Heron Cam/Vancouver Park Board)

Changes to Nesting Habitat

The **renovation and opening of the Stanley Park Brewing restaurant** introduced a change to the surroundings of the colony in a building north of the nesting trees. This building previously housed the Fish House, which closed in 2015, but was a popular destination restaurant already in operation when the colony first moved in at this site. In cooperation with the VPB, SPES, and the Ministry of Environment, Stanley Park Brewing committed to scheduling their construction around guidelines that minimised impact to the herons. While construction had been pushed into the 2019 breeding season due to setbacks, the restaurant opened for the public on July 29.

An independent biological consultant from Bianchini Biological Services conducted a site assessment and regular monitoring of the colony through the breeding season, particularly around impacts of the construction. No flushing events (mass abandonment by the adults in response to stressors) were recorded during these surveys (BBS, 2019) nor were reported to SPES by visitors or nearby residents.

SPES' ground surveys also found that **new nests were built in trees Y and Z, which are closest to the restaurant**. This may be due to the decreasing quality and health of the trees most used since the colony first started, and that the herons are finding these edge trees suitable for their needs. Many maple nesting trees are getting frail from the yearly load of guano, requiring branches to be removed. Trees A & B, which had hosted between 10-25 nests in previous years, both only held one (1) nest each this year.

Egg Toxicity Study

Environment and Climate Change Canada (ECCC) conducted toxicology analysis on select eggs from our colony this year. They conduct an egg collection every 4-5 years as part of a long-term study that examines potential contaminants in coastal habitats in the Strait of Georgia ecosystem. Herons have been identified as an ideal long-term indicator of toxic contaminants for this region due to their diet and because coastal populations are non-migratory (Elliot, 2019).

With SPES' input and supervision, scientists **ascended Tree E on April 24 and collected five (5) eggs**, one from five different nests. The nesting adults did not flush nor show signs of distress from the exercise. Those incubating in the nests that were collected from did move away after some resistance and returned to their nests afterwards.

Public Outreach

Public education and interpretative programming was 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 March 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](#).



Figure 6. SPES volunteer Vanessa Lange mans the heron outreach table in June. (Photo: Dannie Piezas/SPES)

Continuing from last year's success, SPES—with support from the Park Board—offered **live, in-person, weekly interpretation at the colony**. We directly engaged with over 300 people. Visitors enjoyed the education service and the chance to ask questions; SPES, meanwhile, was able to get a sense of the public knowledge on these birds, whether among local residents, heron fans from around the Lower Mainland, and even tourists from across the globe. People had the chance to view the scope at the herons, handle taxidermy specimens, and take home information on how they can be part of the herons' conservation.

New additions to the outreach this year were **Facebook livestream Q&As** with a SPES educator (through the VPB page) and increased social media updates on the herons through Twitter and Instagram, using the hashtag *#herontalk*.

SPES also led **five educational walks** focused on the heron colony: four during our Earth Day celebration and two in June.

Acknowledgements



Figure 7. Some of our amazing SPES staff and volunteers who contributed to monitoring in 2019. From left to right: Frank Lin, Meghan Cooling, Vanessa Lange, Maria Morlin, Kate McEvoy, and Julie Emerson. (Photo: Maria Morlin)

We would like to thank our **volunteers** for their efforts in counting Great Blue Herons through the year—in all kinds of weather. Without their help, the data for this report (and our continued heron conservation work) would not exist. One of our new volunteers this year, Frank Lin, documented in spectacular detail the story of many observable nests from the ground and the rooftop. His photographic report can be viewed through [this link](#). We also particularly thank Maria Morlin for her support and accumulated expertise since the early days of this monitoring program!

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 **32 Adopt a Heron Nest donors** of the 2019 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 2020!

Written by: Dannie Piezas, SPES Urban Wildlife Programs Coordinator

More information: <http://stanleyparkecology.ca/herons/>

Contact: nests@stanleyparkecology.ca or (604) 689-2473

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Appendices

Appendix 1: Area map

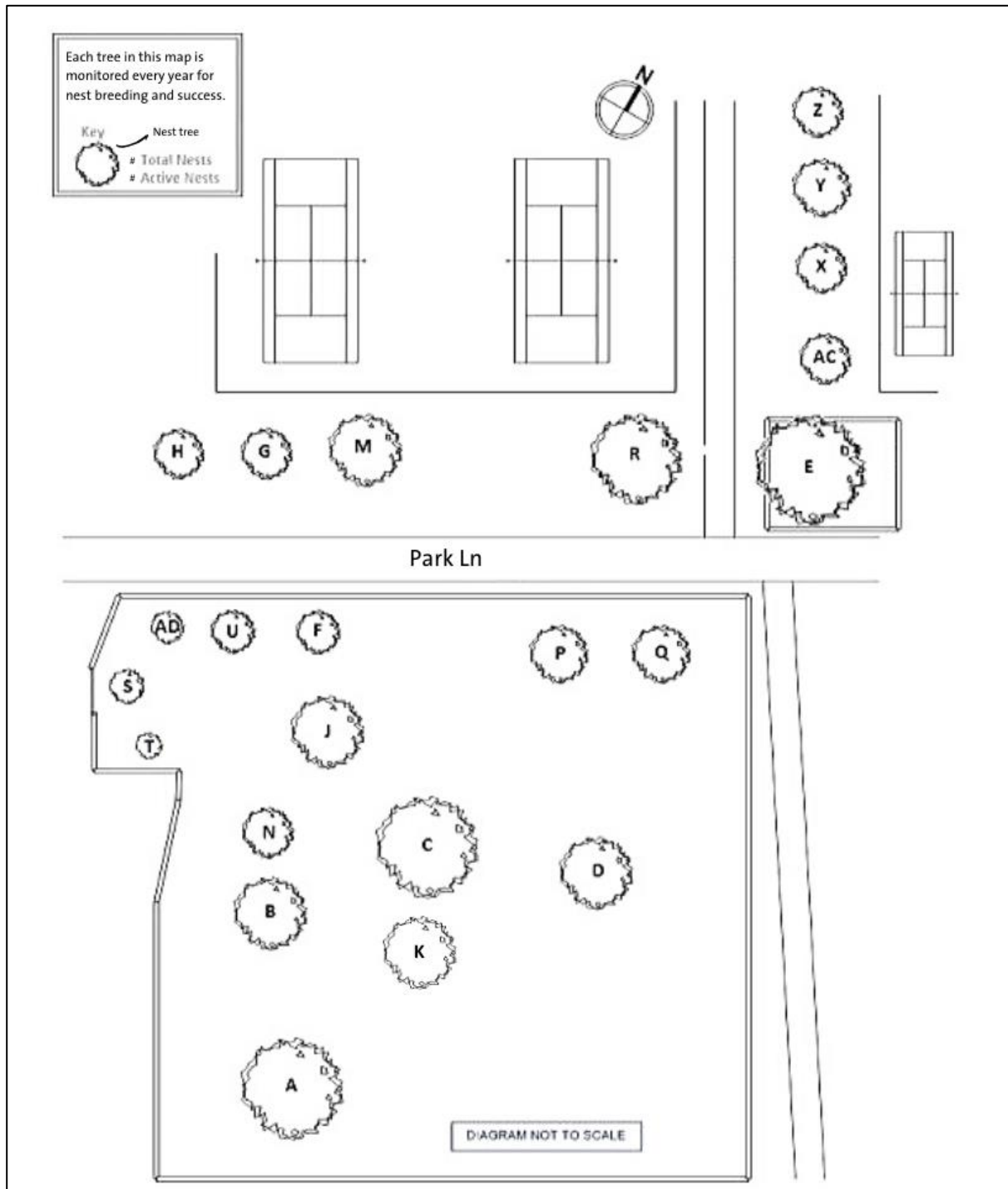


Figure 8. Map of the Stanley Park heron colony layout, with nesting trees labelled. The Heron Cam is mounted on a building south of the mapped area.

Appendix 2: Survey methods and limitations

Rooftop surveys (which gave us visual access to our 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 9. Monitors enjoying the view during the first rooftop survey in March. (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.

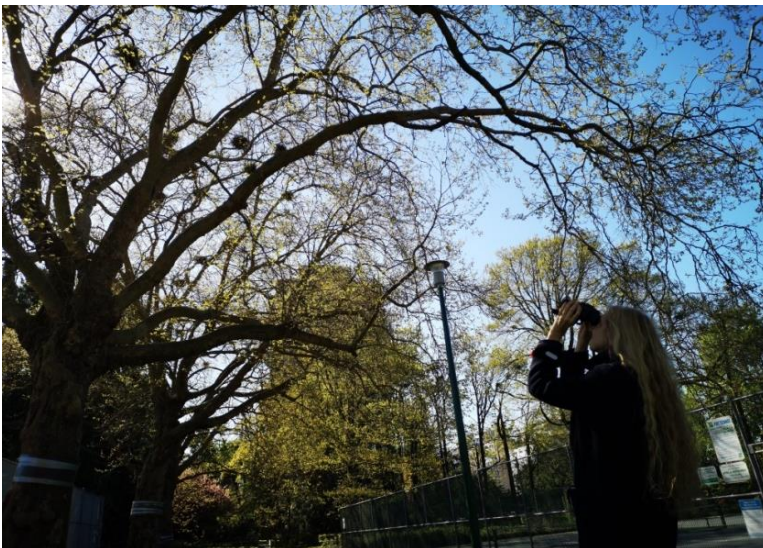


Figure 10. Volunteer Julie Emerson undertaking the ground survey in late April. (Photo: Dannie Piezas/SPES)

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 11.** One of the first males to scout and claim a nest in the heronry this season, viewed from the Heron Cam on March 13. (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 biases introduced by factors that affect the selected nests. These sample 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.
- There may be a bias introduced by the above as **these nests could be more susceptible to predation** because of their higher visibility. This may affect our measures of nest success and productivity.

- **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 remains to have some of the best collected datasets of Pacific GBHE due to the access available to us. We are able to run these surveys with higher 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 12. 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 was fairly easy to follow the success of this family due to the nest's season-long visibility from both the rooftop and Heron Cam.
- The family started with four (4) eggs but only fledged two (2) young. This nest was practically a textbook case of Stanley Park GBHE breeding, since they lay an average of four eggs and this colony's average nest productivity is at 2.02 nestlings. We often centered our Facebook livestream sessions on this nest due to their spectacular observability.
- We captured interesting behaviour when a parent regurgitated a whole carp in the nest while the chicks were around 2 weeks old. The small chicks proceeded to peck at this large fish, which was far from their usual practice of feeding straight from the parent's opened beak. This footage can be viewed through [this link](#) (beginning at 0:45).



Figure 13. A full “family photo” of Nest K1, with four huddled little hatchlings at only two weeks old. (Photo: Frank Lin)

Tree R, Nest 7

- This nest hatched 3 chicks in early May. On the July 9 rooftop survey, monitors were surprised to find a dead chick in the nest beside its living sibling. The remains looked fairly dismembered and bloody, especially in contrast to the whitened nest from a season's worth of guano. The state of the remains suggests this nest was attacked by a predator—likely an eagle—however, eagles typically carry their prey to their own nest after an attack. It may be that the chick was too large to carry off and was partially consumed in the incident.
- Herons can be negligible nest keepers and may leave even dead chicks in the nest through the season (SCCP, 2017). The remaining chick seemed fairly undeterred by its dead sibling until it fledged in late July.



Figure 14. The remaining chick in Nest R7 sits beside its deceased sibling on July 9th. (Photo: Frank Lin)

Nests in Tree X and AC

- These trees are beside the Stanley Park Tennis Courts and are within 100 m of the Stanley Park Brewery building.
- Four (4) nest-bound chicks between two (2) nests were still observed in these trees up until mid-September. These were the latest chicks this season and compared to the last 10 years.



Figure 15. One of the remaining late chicks (at around 12 weeks old) peering down from Tree X, still in the nest on September 7th. (Photo: Frank Lin)

Appendix 4: Data tables

Table 2. Number of nest and fledglings at the Stanley Park heron colony in 2019. 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 use the highest number of the season recorded on April 16, before tree foliage started to obstruct visibility. (Source: Ground survey)	106
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)	49
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)	38
Sample successful nests	Number of sample nests that successfully reared young to the fledging stage. (Source: Rooftop survey)	34
Sample fledgling count	Number of fledglings assumed to have survived the nesting season and flown their nests. (Source: Rooftop survey)	67

Table 3. Sample success rate, sample productivity, number of active nests, and estimated total fledglings at the Stanley Park heron colony in 2019. 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)	69%
Sample nest productivity	The average number of fledglings produced per successful nest. (Sample fledgling count / Sample successful nests)	1.97
Active nests	The number of nests in the whole colony that were assumed as occupied by a mating pair (whether successful or not). $[(\text{Sample active nests} * \text{Total nests}) / \text{Sample total nests}]$	82
Estimated fledglings	The estimated number of fledglings from the whole colony which now contribute to the regional population of GBHE. $[(\text{Sample fledgling count} / \text{Sample total nests}) * \text{Active nests}]$	112