VANCOUVER BOARD OF PARKS AND RECREATION

VANCOUVER PARK BOARD
CANADA GOOSE MANAGEMENT PLAN

Canada Goose Management Plan Acknowledgements

The Vancouver Board of Parks and Recreation (Park Board) operates on the unceded territories of the xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh (Squamish), and səl̓ilwətaɁɬ (Tsleil-Waututh) Nations. The local First Nations continue to steward the land since time immemorial. The Park Board recognizes its legacy of colonialism, including the forced removal of Indigenous peoples from their land to create parks, the resulting loss of traditional places, and the introduction of non-native wildlife. The Park Board hopes this work can contribute to restored ecology and opportunities for collaborative management with First Nations and other governments.

The Park Board would like to give a heartfelt thank you to the contributors to the Canada Goose Management Plan including Park Board Operations staff; Jody Watson at the Capital Regional District, Deb Tardiff at the City of Parksville, and members of other Metro Vancouver municipalities; Kate Hagmeier for clear and valuable guidance. The ideas and feedback received during the development of this plan have contributed positively to its completion.

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EXECUTIVE SUMMARY

There is a need to manage temperate-nesting (resident) Canada geese in Vancouver, particularly at high-profile park sites, which often provide optimal habitat for geese. **Resident geese have demonstrable impacts on Vancouver Park Board (Park Board) managed properties.** This Action Plan characterizes Vancouver's resident Canada Goose population and the associated challenges and offers a suite of management options and actions to mitigate impacts. This Action Plan is supported by the Vancouver Park Board Goose Management – 2022 Survey Technical Report (Technical Report), which offers information on population size, composition and distribution. Data from this report, examples from other jurisdictions, and other available sources support this Action Plan to guide a recommended management approach.

Resident Canada Geese are non-migratory. Their populations are the result of programs that relocated geese to southern British Columbia from outside the province over 40 years ago. Today's population are the offspring of an introduced population that did not develop natural migratory patterns and is not native to the Lower Mainland. Impacts related to a growing population include territoriality, damage to infrastructure and sensitive ecosystems, and high-density fecal matter on beaches, pathways and grass. The most significant impacts of congregations of geese are felt in locations where they are fed, on beaches, and on manicured lawns.

Compared to natural and migratory populations, resident geese in Vancouver do not experience pressure from hunting or predation, they do not spend energy on migration, they have access to food from forage and illegal feeding, and they have access to ideal habitat with little disturbance.

Canada Goose

These conditions put few limitations on resident, urban goose population growth, which occurs at a higher rate than their non-urban counterparts. In 2022, approximately 25% of the observed pre-moult population were goslings, indicating a rapidly growing population with an estimated 18% recruitment (goslings living to enter the adult population; (Technical Report).

Population modeling indicates that the rate of population growth slows when population controls like increased egg addling and lethal removal are applied. For example, if 200 adult geese were removed each year, population growth would plateau within 20 years and the population size could become stable. This scenario is only effective if management actions, lethal and non-lethal, are applied in the long-term. It is possible that more geese than 200 can be removed in a single year with demonstrated need and the support from Federal and Provincial regulators.

As recently as 2010, a combination of relocation and egg addling was used to prevent population growth in Vancouver; with limitations on relocation permits and reduced funding for addling, the programs were cancelled or significantly scaled back. In recent years, goose management has focused on egg addling to control the number of eggs that hatch. Annual results of egg addling have been variable, and population growth has continued year-over-year; to see a plateau in population growth in Vancouver, egg-addling would need to be increased substantially. While relocation is no longer a reliable option, continued population growth and associated impacts can be mitigated

Adults & juveniles at Sunset Beach Park

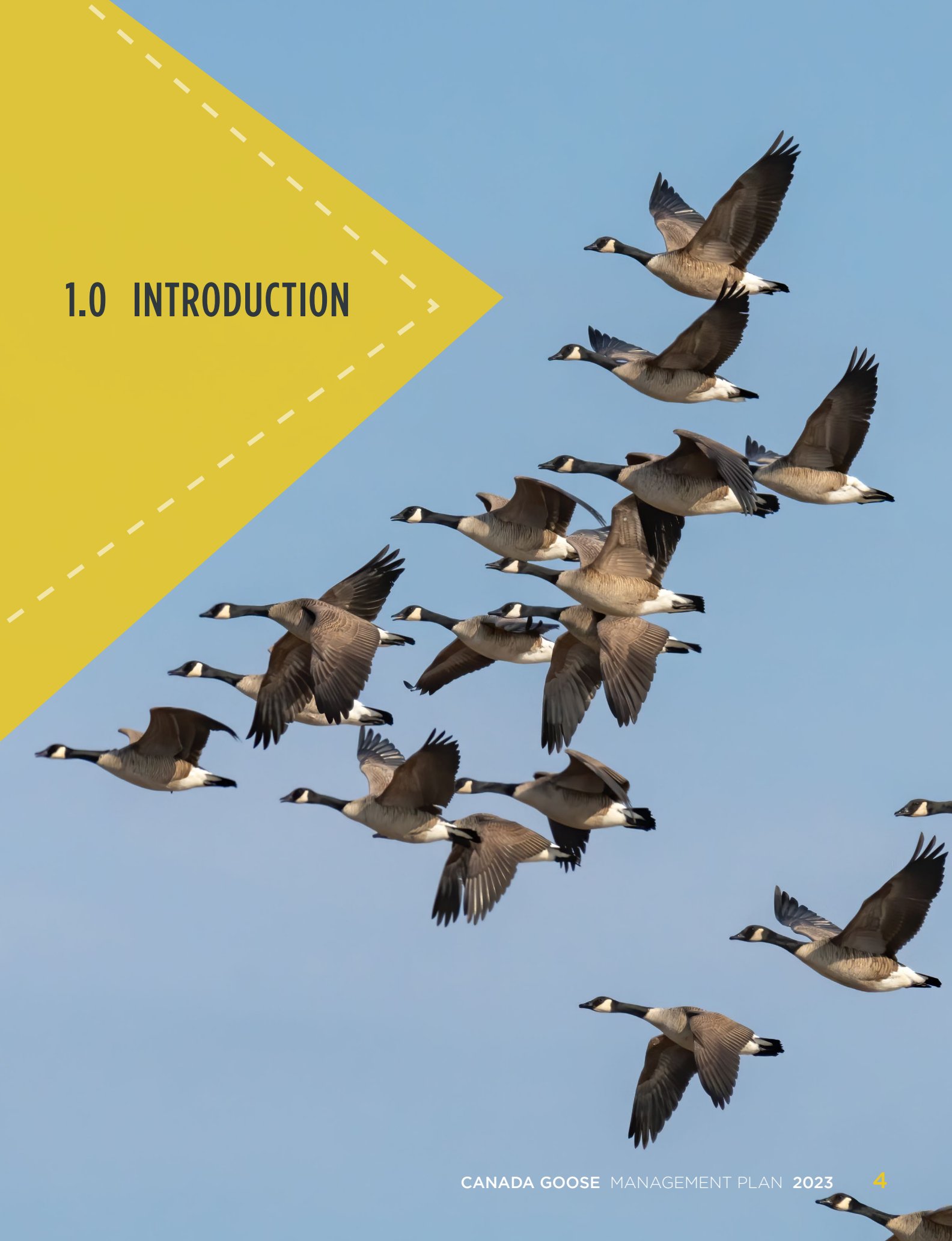
using a suite of proven techniques tailored to Vancouver's park system and operational needs. These techniques prioritize humane treatment of geese and include landscape modification, water management, hazing, and lethal control. In combination with operational efforts to implement mitigation measures and prevent goose-related impacts in parks, public education, and collaboration with other land managers in the city, regional municipalities, health authorities, the airport authority and others is required to address the issue and prevent geese from continually moving across jurisdictional borders.

No single mitigation technique will provide the solution for reducing Canada goose conflict or impacts. An effective management program applies a range of seasonally timed techniques to control the size and distribution of the goose population humanely. Allowable mitigation techniques under the Migratory Birds Regulations guide effective program development and are discussed in Section 5. Passive techniques in combination with population control are necessary to prevent continued growth. Population control by removal requires an approved management plan, demonstrated implementation of other mitigation measures, and a permit issued by the Canadian Wildlife Service.

This Action Plan incorporates recommended practices identified in ***Best Practices for Management Plans: Canada Goose and Cackling Goose Management*** developed by the Canadian Wildlife Service of Environment and Climate Change Canada. In doing so, this ***Vancouver Park Board Canada Goose Management Action Plan*** describes options for long-term, multi-faceted approaches to management of non-migratory, resident Canada geese.

A commitment to this effort including regular operational funding is required to prevent the population from continuing to grow or rebounding after an initial effort, including after a lethal removal. This management plan is the first step to guiding a robust response that includes implementing actions, monitoring their success, and adaptive learning for long-term population management. The next step toward population management is developing an implementation plan for actions in specific parks using this document as a guide.

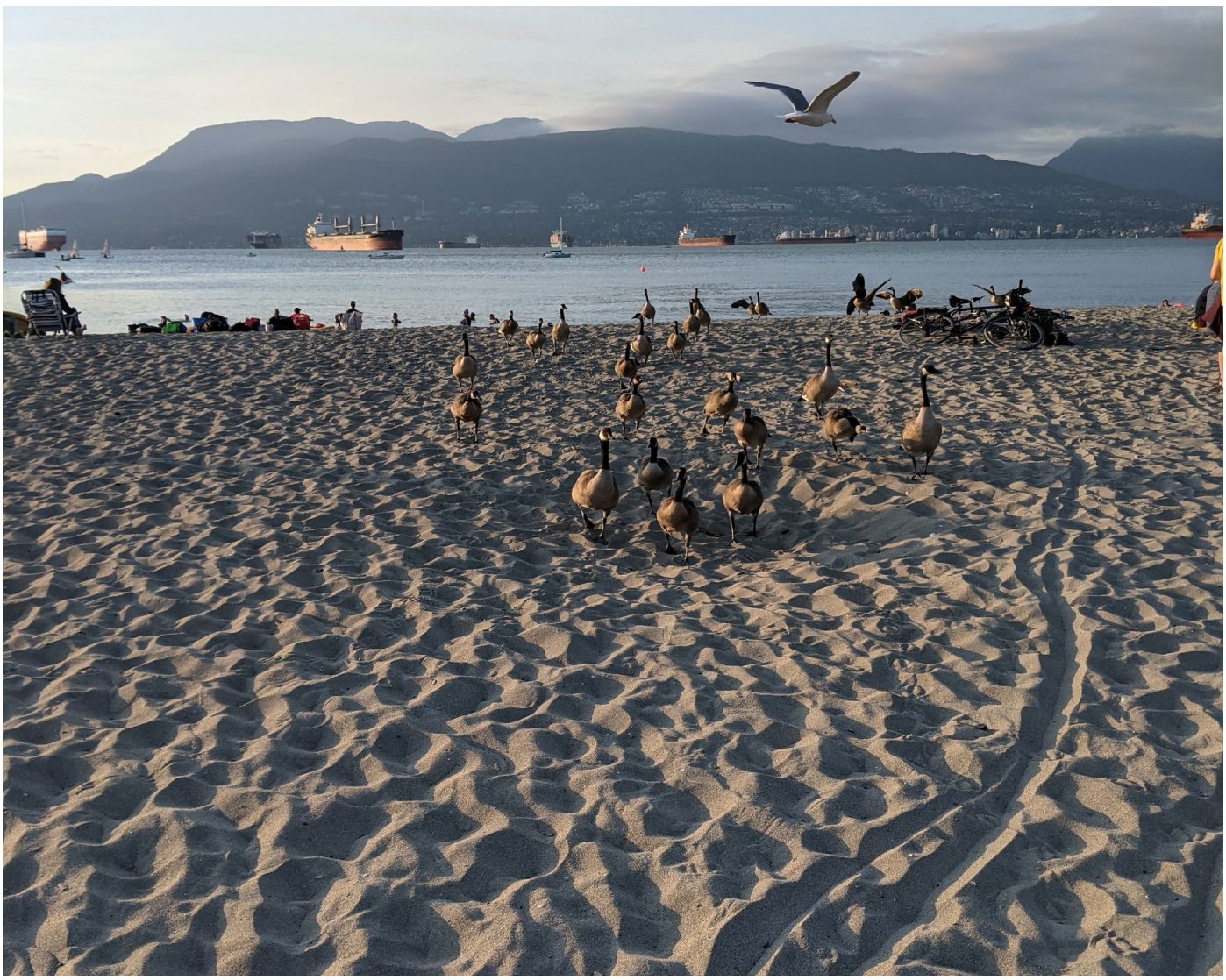
1.0 INTRODUCTION



1.1 PURPOSE OF THE PLAN

The Vancouver Park Board developed this Action Plan and the accompanying technical study drawing on expert input to characterize the goose population, impacts on the landscape, and determine an appropriate suite of actions in response to a growing population. The purpose of this Action Plan is to provide strategic guidance for management of resident Canada geese in Vancouver parks, including a Park Board led approach to minimizing impacts of geese on parks and park users. The next step toward population management is developing an implementation plan for actions in specific parks using this document as a guide.

Canada geese and management of geese discussed in this document is only applicable to resident Canada geese. Information included is based on the best knowledge available at the time of document development. The implementation of this work is intended to be performed through an adaptive management process as new information becomes available.



Geese congregating at Jericho Beach Park.

2.0 ISSUE SUMMARY

Figure 1: City of Vancouver with highly impacted parks identified, source: City of Vancouver VanMap Viewer, accessed March 2023.

2.1 CITY OF VANCOUVER MANAGEMENT AREA

The City of Vancouver (the City) is in southwestern BC, within the traditional and unceded territories of the xʷməθkʷəy̓əm (Musqueam), Sḵwx̱wú7mesh (Squamish), and səl̓ilwətaʔɬ (Tsleil-Waututh) peoples **(Figure 1).** The city is a mosaic of landscapes, many of which incorporate greens spaces such as neighbourhood parks, school grounds, golf courses, community gardens, forested areas, ecologically sensitive areas, shorelines, beaches, and tourist attractions. Maintaining environmental, social, recreational, and economic benefits of these sites is a priority for the Park Board. As such, mitigating damage and conflict resulting from Canada geese is a priority management issue.

2.2 RESIDENT GEESE IN THE CITY OF VANCOUVER

Canada geese (*Branta canadensis*) and closely related Cackling geese (*Branta hutchinsii*; hereafter collectively referred to as Canada geese or geese) are naturally migratory. However, some populations that do not migrate or conduct very protracted migrations have established in urban and rural environments. These Canada geese are often referred to as non-migratory, urban, or resident populations. Canadian Wildlife Service (CWS), a branch of Environment and Climate Change Canada (ECCC), refers to these populations as temperate-nesting geese; they will be referred to as resident geese in this Action Plan. Most of these populations result from conservation

programs that relocated geese to southern BC from areas outside the province in the 1960's and 70's (Campbell et al., 1990; Smith 2000). Origins of these populations are summarized by CWS in their ***Handbook on Canada and Cackling Geese: Management and Population Control in Southern Canada*** (ECCC, 2010). In addition, the Technical Report provides background on the origin and growth of goose populations in Vancouver, and a detailed timeline of populations and management in Vancouver is provided in Pierce (2016). Importantly, the City's resident goose population is composed of offspring of geese that were *introduced* decades ago. **Resident geese are not native to the Lower Mainland**; these introduced geese did not develop natural migratory patterns and their generations of offspring remain in the Lower Mainland, including Vancouver, throughout the year and in growing numbers.

Unlike most familiar wildlife in British Columbia (e.g., coyotes, raccoons, and other mammals), which fall solely under jurisdiction of the provincial ***Wildlife Act***, Canada geese and other waterfowl are also protected under the federal ***Migratory Birds Convention Act*** and pursuant ***Migratory Birds Regulations*** which provides the senior jurisdictional authority. Thus, any attempts to manage geese must abide by the Federal Act as well as any provincial and municipal regulations that apply.

On the seawall

2.3 IMPACTS FROM GEESE IN VANCOUVER PARKS

Management programs in the 1980's at Stanley Park slowed goose population growth in the city core using egg addling and temporary relocation. In the early 2000s, the programs were reduced (i.e., egg addling) or no longer permitted (i.e., temporary relocation) (Pierce, 2016; Worcester, 2010). Since then, the number of geese has steadily increased and so have related conflicts, including:

- Territorial geese actively protecting their nest sites and young broods.
- Territoriality and increasing number of nests exclude naturally nesting species resulting in decreased biodiversity.
- Aggressive geese are a safety risk to park users and staff near nest sites and goslings.
- Damage to sensitive ecosystems through excessive grazing, trampling, erosion, and fecal contamination.
- Damage to park lawns and infrastructure **(Figures 2a and 2b)**.
- Geese aggressively begging for food, creating conflict and risk to park users.
- High density fecal matter on beaches and grass (e.g., picnic sites, play areas and sports fields).
- Fecal coliform and other infectious organisms originating from goose feces entering swimming water.
- Families of geese crossing streets, creating traffic hazards.

Figure 2a: Canada geese in Douglas Park wading pool preventing safe use of the amenity.

Figure 2b: Holes dug by geese to encourage ponded water for drinking in a park lawn. Goose droppings coat the grass.

The goose population in the City has not been thoroughly enumerated. Abundance and distribution surveys have focused on key parks and areas of human-goose conflict. As of 2022, surveys show that the population is at minimum 2,200 individuals and is likely much higher given the surveys were only conducted in a few months of the year in highly impacted parks (Appendix A; Pierce, 2016; Jones, 2022; Lauer, 2022). In summer, popular parks (e.g., John Hendry, Stanley, and Jericho Beach) host greater than 1,000 geese on a given day **(Technical Report)**. During spring and fall, migratory geese passing through the area likely augment this number. **The management program in this Action Plan intends to target resident geese, who make up the entire spring nesting and moulting population and excludes migratory geese.**

To some extent, geese change their habitat use seasonally, and conflicts vary seasonally in accordance. For example, in spring when geese are nesting and moving around less, they are not so obvious on the landscape, whereas in the summer, high use of manicured lawns and beaches (e.g., Trout Lake, Stanley Park, English Bay, Jericho) where people also congregate, is often observed. The 2022 technical study and survey (Technical Report) indicates that specific habitats were used within parks, with manicured lawns, including irrigated sports fields and other high-maintenance turf, identified as the most heavily used goose habitat **(Figure 3)**.

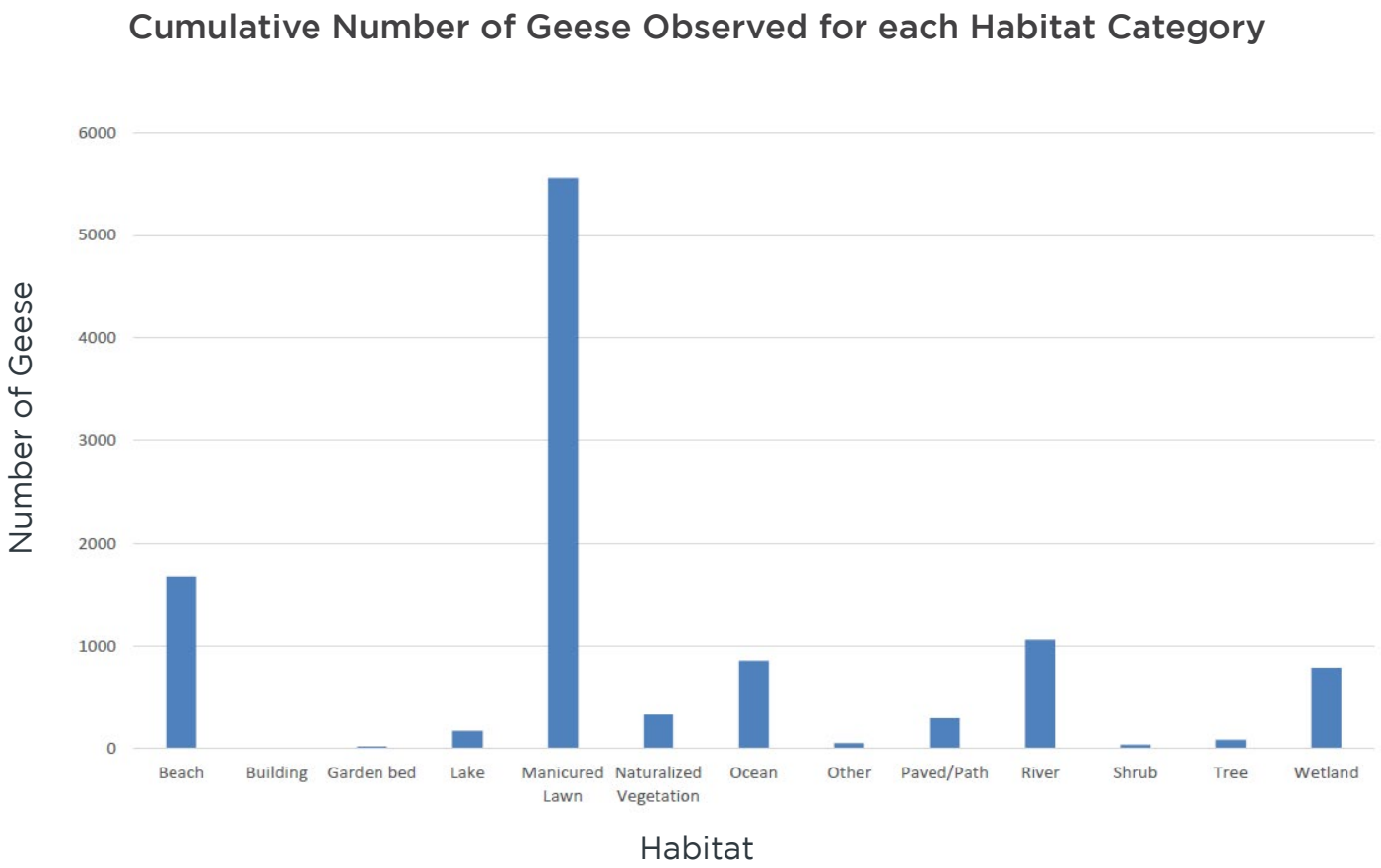


Figure 3: Use of specific types of habitat by geese in the Vancouver Parks.

Canada Goose being hand fed.

2.4 DEVELOPING A LOCAL CANADA GOOSE MANAGEMENT STRATEGY

The Park Board has identified a need to manage resident Canada geese within the borders of the City, particularly at high-profile park sites that provide optimal habitat for geese. Parks, including Stanley Park, John Hendry Park, and iconic shoreline parks are important components of the City's landscape; they provide recreational, tourism and environmental benefits, as well as neighbourhood character.

Effective goose management requires long-term commitment of resources to support a comprehensive program including multiple mitigation measures that reinforce each other. Missing even one year of an established population control program can set back progress by several years, as demonstrated by Worcester (2010), who showed that when successful population control programs were reduced in Vancouver, the goose population rebounded and continued to grow.

Between the 1980s and 2009, the Park Board's goose management program included egg addling, relocating goslings early to prevent imprinting on the area, and relocating adults during moult. Relocations are no longer practical or permitted in the Lower Mainland (Worcester, 2010). In recent years, goose management has focused on egg-addling to limit the number of eggs that hatch. Annual results of egg-addling have been variable and insufficient to control goose population growth (Technical Report).

In 2022, the Park Board commissioned a technical study to understand how geese

use Vancouver parks during the spring and summer: Vancouver Park Board Goose Management—2022 Survey Technical Report. Using data from the technical report and other available sources, the Park Board has developed this Action Plan to guide their management approach. The technical report is available online, although elements of the findings are included in the Action Plan.

Guiding Statement, Policy, and Management Objectives

The Park Board's guiding statement for this work is:

To develop a humane, information-based, comprehensive approach for reduction and mitigation of negative impacts resulting from resident Canada geese in Vancouver

Guiding policy includes goals to restore Vancouver's wild spaces and vital biodiversity (Van Play, 2019). Habitat and biodiversity in parks are threatened by a growing goose population.

The guiding statement and policy support the following objectives:

- Conduct annual monitoring on Canada Goose population.
- Develop a knowledge base on Canada goose population management methods.
- Identify and implement feasible mitigation options for the Park Board to help manage Canada geese.
- Develop a long-term management approach so that results are lasting.
- Reduce Canada goose impacts on parks recreational areas, and natural habitats.
- Changes to park vegetation such as converting mowed turf to wildflower meadows.
- Reduce hazards related to the presence of Canada geese on roadways, parking lots, buildings, and other park infrastructure.
- Identify opportunities to collaborate with other jurisdictions on a regional management approach.
- Deliver public education on the goose population and management approaches.
- Increase enforcement of Canada goose feeding.

Nesting on a green roof.

3.0 MANAGEMENT TARGETS

3.1 EVALUATION METRICS

The goal of Canada goose management is to create operational conditions that minimize impacts of geese overpopulation on parks and park users. There are several metrics that, when monitored concurrently and systematically, can evaluate if management programs are working:

1. Number and distribution of geese observed after nesting and during moult, including an estimate of % young (e.g., Lauer 2022).

2. Total number of nests visited, and eggs addled, including nest locations.

3. Number and nature of public complaints received.

4. Financial and staff resources required to mitigate conflicts and manage damage each year.

Declines in metrics would indicate management is effective and that geese are not just moving from site to site. Establishing threshold levels for each metric that represent an acceptable presence of geese in parks supports the adaptive application of mitigation measures. Once thresholds are established, the goose population should be managed to stay below the thresholds. Example thresholds that would demonstrate change in the goose population are:

- Egg addling and other measures result in the percentage of juveniles observed being routinely below 10%, where 5% represents the approximate percentage of geese exiting the Vancouver population through attrition or other means. If the percentage of young is below 5%, the population is not growing.

- Nest finding and egg-addling increases each year to approximately 800 nests or more, where 800 is a likely number of nests for a population of 2100-2500 birds, and then plateaus before it eventually decreases. Egg addling should be performed on all accessible nests on public and private property to prevent population growth.

- Public complaints reduced by 75%.

- Program elements are well-understood and limited annual change means financial and staff time commitments are consistent.

Population reduction is sometimes an additional goal of Canada goose management. To reduce the population quickly, lethal removal of geese is required. To receive permission to dispatch geese from the Canadian Wildlife Service, the applicant is required to demonstrate that they have implemented a comprehensive management plan including other mitigation measures (e.g., hazing, landscape modification, feeding by-law enforcement). Without a robust estimate of the City goose population, a population size target should not be the only goal set to evaluate effectiveness of a management program.

Nesting on rooftop.

4.0 IF GEESE ARE NOT MANAGED

4.1 GOOSE POPULATION GROWTH

Introduced resident Canada geese in the Lower Mainland, including Vancouver, experience few limitations on their population growth. For example, compared to natural populations, they do not experience pressure from hunting or predation, they do not spend energy on migrating, they have ample food from forage or illegal feeding, and they have limited disturbance in ideal habitat (e.g., mown, irrigated lawns). Consequently, population growth rates are higher than they would be for a non-urban, native population. Few studies provide survival estimates of strictly urban populations that are not subject to some level of hunting; however, studies that have examined urban survival showed adult winter survival at greater than 90% and up to 100% (Dorak et al., 2017; Groepper et al., 2008; Powell et al., 2004). Survival estimates of urban first year young are also relatively high with greater than 75% of hatched young surviving to adulthood (Conover, 1998; Warhurst et al., 1983). Data on local gosling recruitment (i.e., the number of geese that survive from hatch and enter into the adult population each year), mortality, and immigration are currently insufficient to estimate the City's goose population growth rate; however, in 2022 approximately 25% of the observed pre-moult population were goslings, indicating a rapidly growing population with an estimated 18% recruitment (Technical Report). For reference, the 5% of the pre-moult population would be goslings if the population was in a steady state compared to the 25% observed in 2022.

Using population modelling, **Figure 4** depicts projected responses of Vancouver's goose population to different management strategy simulations. Modeling revealed that a population of about 2,500 temperate nesting Canada geese, with 18% recruitment would rapidly increase if no new action were taken. Growth flattens at different rates when population controls such as increased egg addling and lethal removal are applied. For example, population growth can be stabilized within 20 years with a combination of egg addling and removal of about 150-200 adults each year. A commitment to management actions for the long-term is required or the population will quickly resume growth. This concept was tested in a model that assumed 200 adults were removed each year, but only for two years. The population resumed growing at approximately the same rate as if the adults had not been removed **(Figure 4)**.

In reality, the maximum possible number of geese Vancouver parks can support is likely less than the 80,000 geese projected in the "status quo" scenario of Figure 4 however, the models demonstrate the goose population's robustness and the impacts of strategic management actions to guide population change. **A population as large as tens of thousands of birds in Vancouver or a neighbouring municipality would impact the entire region.** Other actions can be taken, including widespread habitat modification and hazing, that when combined with egg addling and/or removal, may reduce population impacts broadly and in specific parks prior to reaching a manageable population size.

4.2 HUMANE TREATMENT OF GEESE

Humane treatment of resident Canada geese is a critical consideration in goose management, and a requirement for obtaining permits. As the goose population grows, more varied and intense mitigation will be required to control growth and impacts. Over time, a growing population and associated deteriorating living conditions will result in geese using more space and habitat less favourable to them; it would require ongoing

hazing that would negatively affect geese well-being. **Hazing is considered by animal rights organizations (e.g., BCSPCA) to be a humane technique, provided geese have options to land elsewhere.** As the goose population increases, alternative, operationally acceptable habitat options for geese will diminish. In this regard, careful considerations are required such as:

1. What is an acceptable resident Canada goose population size for Vancouver.

2. What humane management practices are appropriate to achieve the acceptable population size, including providing locations geese can use within the park system.

3. How the population should be managed over the long-term to alleviate conflicts between people and geese.

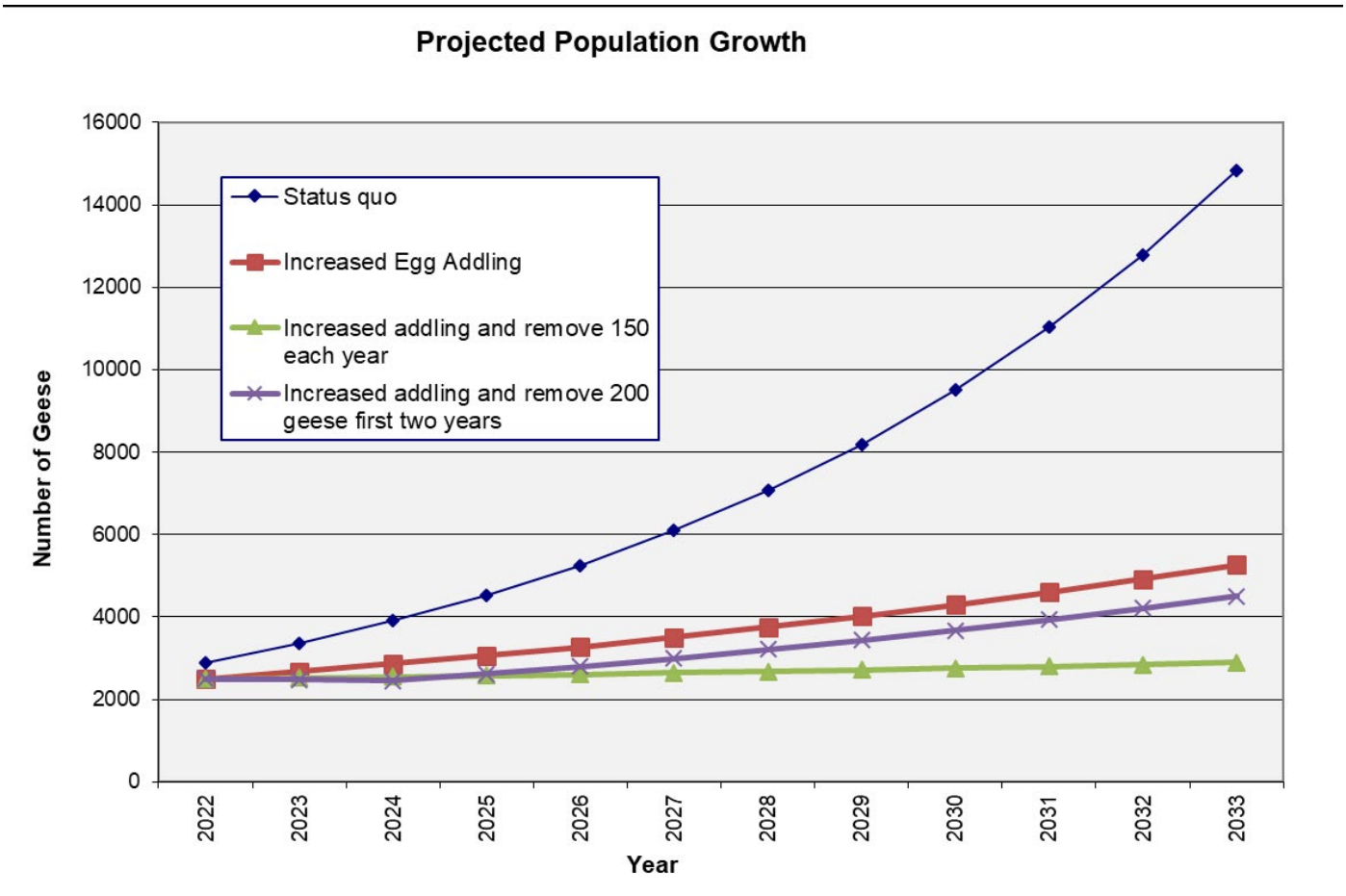


Figure 4: Population modelling projecting the response of the goose population to four different management simulations 1) status quo, n = 2,200, 18% recruitment; 2) increased egg addling up to 700 nests; 3) increased addling and lethal removal of 150 geese each year; and 4) increased addling and lethal removal of 200 geese in the first two years of management only.

5.0 MANAGEMENT AND MITIGATION TECHNIQUES

Mitigation techniques serve to prevent geese from using particular areas, prevent population growth, and reduce population size. No single mitigation technique will provide the solution for reducing Canada goose conflict. A management program must apply a range of techniques that are seasonally timed to humanely and effectively control the size and distribution of the goose population and its impacts. There is a suite of mitigation techniques allowable under the Migratory Birds Regulations that can make up an effective program. The handbook, ***Canada and Cackling Geese: Management in Southern Canada*** describes techniques allowable in Canada (Environment Canada 2010).

Without population control, passive techniques such as landscape modification will lose effectiveness when the density of geese is such that even poor habitats are saturated. Techniques appropriate for Vancouver parks are outlined in the following sections. Techniques to rapidly reduce the population include non-lethal relocation and lethal removal (or harvest); relocation is no longer permitted in the Lower Mainland except for special study areas, and removal requires an established management plan, demonstrated implementation of other mitigation measures, and a permit issued by the Canadian Wildlife Service. Proposed actions and example management scenarios for Vancouver using these techniques are listed in Sections 6 and 7, respectively. More detailed prescription options for specific park sites are provided in the Technical Report.

5.1 MITIGATION TECHNIQUES APPROPRIATE FOR THE PARK BOARD

A. Landscape Modification

Preventing geese from using an area is the most pro-active, non-invasive, and long-term approach to reducing conflict. Reducing habitat attractiveness to geese can include installation of trees, hedges, or other manufactured barriers that prevent easy access between water and land. Seed mixes of grass that are less palatable to geese, and mowing and irrigation regimes that encourage longer, drier and coarse grasses that are less favoured by geese (e.g., meadows), can deter geese from using particular parks or sites

Benefits: target specific sites; can be applied over large areas; prevent habitat damage and restore habitat for other species; a long-term solution; reduce access to water for geese while maintaining benefits for humans.

Challenges: different maintenance requirements; modifications (e.g., coarser grass) not ideal for some other uses; could push geese into other areas where they are not wanted.

Resource needs: dedicated staff time to implementation planning and installation; redirected staff time to new types of maintenance; capital investment in plants, seed, and labour for earthmoving/installation.

B. Water Management

Water management is a specific and crucial element of habitat modification. Open water sources, particularly fresh water, adjacent to lawns or fields are attractive to geese for drinking and protection from threats.

Water management can address locations and characteristics of water features (e.g., fountains, irrigated lawns, ponds) to prevent geese from congregating. Water features can be protected with appropriate vegetation preventing easy access between lawn (food) and water. Addressing broken infrastructure and related ponding prevents geese from congregating. Active water management is especially important in summer when conflicts between people and geese are highest and water availability is scarcer and more concentrated.

Benefits: prevents geese from congregating and fouling areas of interest with droppings; addresses broken infrastructure; more efficient use of potable water.

Challenges: reduced watering could impact other lawn uses (e.g., irrigated sports fields); no existing best management practices for water management for geese; different approaches for private and public spaces.

Resource needs: staff or consultant time to develop implementation plan and/or best management practices; prioritize investment in broken infrastructure where it attracts geese.

Adults & juveniles in the water.

C. Hazing/Scaring

Hazing is an effective means of temporarily scaring geese away from a conflict area and can be especially useful in parks and golf courses during peak summer public use. The key to hazing is to prevent establishing a routine that geese become habituated to so hazing no longer works; applying a suite of techniques in problem spaces is essential. An unintended consequence of hazing geese can be the shift of geese from one location to another, creating a problem in new locations; planning coordinated hazing efforts to direct geese to an acceptable area can be effective.

Benefits: effective for short time periods where acute issues exist (e.g., event spaces, pools); coordinated effort can reduce issues associated with large congregations of geese

Challenges: establishing refuge areas for geese to retreat to; geese can become accustomed to regular hazing activity; geese move to another area where they are not wanted; time- and labour-intensive

Resource needs: staff or contractor time to establish an implementation plan; staff time to implement hazing on a daily basis

D. Temporary Relocation

Currently, with the large and widely distributed regional resident Canada goose population, and highly transmissible avian influenza (H5N1), relocation is not likely feasible. For a permit to be authorised by ECCC, a suitable receiving site, signed by the landowner must be identified in the relocation application. In addition, relocation is relatively resource heavy and must be conducted in consecutive years to have an overall benefit. However, as the goose population declines, relocation may be a reasonable future option to manage small conflict pockets of geese. Relocation guidelines are provided in ***Best Practices for Capturing, Transporting, and Caring for Relocated Canada Geese*** (Environment Canada 2011). Relocation is not currently recommended, but is a management tool to remain aware of, for potential future use including as a potential requirement of a lethal removal program.

Benefits: Geese are relocated to areas where there is space for them

Challenges: few, if any, jurisdictions will accept relocated geese because most are challenged by growing goose populations

Resource needs: staff time and funds to support planning and implementation

E. Population Control

Reduction of Canada goose numbers must occur to achieve a balance between geese, the environment and people. Tools typically used to control geese in rural settings include hunting within regulated seasons, and use of federal Danger or Damage permits to protect crops. Vancouver is a largely urban environment with no areas open to hunting and limited agriculture. This inherently limits potential use of some otherwise allowable population control techniques. Currently, use of chemical birth control (e.g., OvoControl) is not available in Canada for use on geese.

Egg addling

Population control using egg-addling is the most available method to continue slowing population growth; to see a plateau in population growth in Vancouver, egg-addling would need to be increased substantially. Egg-addling alone will not result in population reduction. **Egg-addling is a simple and humane tool for controlling the reproductive**

Goose eggs in a nest.

output of Canada geese. Addling is a technique that renders the embryo in an egg non-viable. In Vancouver, trained technicians remove eggs from nests and replace them with previously collected eggs that have been slowly cool and frozen to render them non-viable; the addled eggs are warmed before they are placed in the active nests so they will be accepted by the nesting geese. To be effective, crews are trained to systematically access nesting areas and addle eggs so that geese will not lay a new clutch of eggs in the same season. Crews are thorough to ensuring all accessible nests in a targeted area are included. Egg addling occurs from March to May, peaking in April when most nesting occurs. Egg addling is often within public viewing and crew members are trained to sensitively address questions and refer the public to a project manager and other educational resources for additional information. Many nests are located on private property and the Park Board makes an annual request to the public to report and provide access to nests on private property, but with no obligation to provide access, some nests and eggs cannot be included in the addling program.

In addition to the actual addling, an addling program should include provision of an egg addling protocol manual, mapped nest locations using GPS technology, and maintaining digital records of nest sites and addling activities so that success can be measured and is improved upon year-over-year. The addling protocol guides the work of the technicians and support staff from other departments and can be used as a resource to answer public inquiries specific to the Park Board egg addling process.

Egg addling must be authorized by ECCC through the application for a ***Damage or Danger*** permit under the Migratory Bird Regulations. Field methodology must be consistent with the ***Handbook, Canada and Cackling Geese: Management in Southern Canada*** (ECCC 2010) and follow the recently revised ***Humane Society of the United States Canada Goose Egg Addling Protocol*** (2020). The incorporation of Humane Society methods ensures that the addling program is sensitive to goose welfare and public concerns while maintaining a robust methodology.

Benefits: prevents new breeding birds from entering the population; prevents population from growing as rapidly as it would with no intervention; humane and supported by animal rights organizations

Challenges: locating and accessing nests in large enough numbers

Resource needs: staff or contractor time for training and addling; seasonal equipment rentals

Permits for lethal removals

ECCC may authorize lethal removals of adult geese through ***Damage or Danger*** permits to land managers to protect lands from damage caused by Canada geese. **The two types of permits are:**

1. **Kill-to-support-scaring:** issued to land managers when the intent is not to reduce the goose population, but to protect lands through changing goose behaviour. These permits are commonly used by farmers, but in urban settings have been used by golf-courses, for example. Generally, conditions of these permits allow two geese per day (maximum) to be removed. Ideally, the carcasses are left to act as deterrents for other geese. In doing so, geese learn the consequences of grazing in fields where scaring techniques are used.

2. **Kill-to-remove permit:** issued only if the land manager is able to demonstrate all other management practices have not been successful. The applicant is also required to provide a management plan for the properties. The goal of this permit is to allow the land manager to reduce the number of geese on the land being damaged by geese.

Under the current framework, federal removal permits can only be considered if the land manager is able to demonstrate all other management practices have not been successful. For example, to obtain a removal permit, the Park Board would need to demonstrate to the regulator that other non-lethal mitigation measures have been implemented and monitored and demonstrate that they are not effective enough to deter geese adequately to prevent Damage or Danger (as defined by ECCC). In recent years, removal permits have been issued for harvests of moulting Canada Geese on Vancouver Island. Harvests were conducted through partnerships between the not-for-profit group Guardians of our Salish Estuaries and Indigenous Guardians of participating First Nations (e.g., K'ómoks Guardians). Harvests were authorized because of serious ecosystem damage and loss of salmon and wildlife habitat caused by resident geese. Harvested geese were a food resource for participating Nations. Other products such as goose down were used to reduce waste.

A recent update (July 2022) to the ***Migratory Bird Regulations*** allows for geese taken in a managed removal to be provided to a charity (e.g., food bank) with the use of a federal Charity Permit (ECCC, 2022). Prior to this, geese taken under a ***Damage or Danger*** permit could only be consumed by the individual permit holder (CWS, 2011).

Managed removals would reduce the resident goose population, decreasing its size and breeding potential. The goose population must be monitored after the implementation of any mitigation technique to determine how the population responds, and to determine if the feasibility of a managed removal should be discussed with CWS. Ongoing application of non-lethal mitigation measures would continue to be required in the long-term after removals to prevent the population from rebounding.

Benefits: removes breeding geese from the population permanently; meat can be consumed; requires comprehensive management plan supporting healthy population management

Challenges: ongoing implementation of complementary mitigation measures to prevent population from rebounding; geographic limitations to harvesting activities

Resource needs: experts trained in lethal removal techniques; funds for meat processing; funds for ongoing monitoring to demonstrate need for future permits

F. Communications & Public Education

A critical part of urban wildlife management is an effective communications plan educating the public on the origins of temperate nesting Canada geese in Vancouver, their associated impacts, and planned management actions. A communications plan that delivers consistent messages regarding goose management and fosters a culture that supports a well-planned strategy is essential for success. Influencing human behaviour is dependent on a clear communications strategy that educates the public on goose behaviours and impacts on the city and encourages people to support proposed management and take appropriate personal action.

Key messages might include:

- Origins of the population and misconceptions associated with the goose population.
- Specific damage/impacts caused by geese.
- By-laws regarding feeding wildlife.
- Mitigation measures being used to manage and population size and distribution.
- Current and projected costs and/or loss of revenue associated with geese.

A robust communications approach will be:

- Transparent, and clearly define the management goals.
- Informative.
- Consistent across all departments.
- Scientifically defensible.
- Offer a point of contact for further information and resources.
- Effective at influencing behaviour and attitudes towards geese.

The topic of Canada goose management attracts interest from individuals and groups with varied opinions on the topic of population management. This action plan offers a reasonable and defensible approach for protecting habitat, park users and wildlife and suggested ways to communicate about the approach clearly. This action plan can help readers establish informed opinions on goose management, and access further resources should they want to learn more or participate in goose management activities.

Benefits: transparency and an informed public

Challenges: misinformation shared by other individuals or groups; keeping monitoring data up to date; waning media interest; informing tourists and visitors about feeding and interacting with geese

Resource needs: staff time to generate and share updated web, social media, and news media content

Adults & juveniles swimming.

6.0 ACTION ITEMS AND EXAMPLES FOR VANCOUVER PARKS

A combination of mitigation measures applied strategically and monitored across the city has the greatest likelihood of success at managing the size and distribution of the goose population.

For example, evaluating groups of park sites together supports an appropriate combination of mitigation measures to protect priority sites, provide refuge for geese, and prevent conflict between geese and humans; ongoing monitoring informs adaptations and metrics required to meet objectives. Below are action items applicable in Vancouver Parks, including successful examples from other jurisdictions.

6.1 LANDSCAPE MODIFICATION

Action: Piloting modifications to deter geese from highly impacted areas

Identify areas where impacts are high and changes to the landscape can be accommodated to create less goose-friendly landscapes. Modifications like installing vegetative barriers between water and grass or installing less palatable varieties of grass can prevent geese from congregating. At some sites, changes may be seasonal, like a temporary barrier between a grassy area and a beach and target critical times such as moult in June and July when geese are flightless and seek out areas with safe and easy access to water and grass.

Candidate sites: Trout Lake Swimming Beach, Heron Lawn at VanDusen Garden, Jericho Pond.

Retractable nets at Alta Lake, Whistler, BC are deployed in the evening and put away in the morning to prevent geese from accessing the shoreline. The fence tucks neatly away during the day and removed in the winter; the posts remain in place all year. This is most effective during moult.

CASE STUDY

Action: Prevent creation of new goose-friendly habitat

Develop Best Management Practices (BMPs) or guidelines for staff, contractors, and developers for park and private site designs that prevent creation of new goose-friendly habitats. Incentivizing or making the BMPs mandatory in RFPs and project implementation can increase their application.

6.2 WATER MANAGEMENT

Action: Carefully manage water features and water sources

Evaluate sites where fountains, irrigation, or other standing or flowing water is present to determine if they are required all year, if there are repairs that can prevent ponding, or if they are necessary at all.

Develop BMPs for water feature installation and design and related water management including all water features (e.g., irrigation sites, storm drain overflow, ponds/wetlands, fountains, and aesthetic features). Recommendations for seasonal operation of a feature, or an enhanced maintenance schedule can be included in water management BMPs.

6.3. HAZING/SCARING

Action: Coordinated hazing pilot

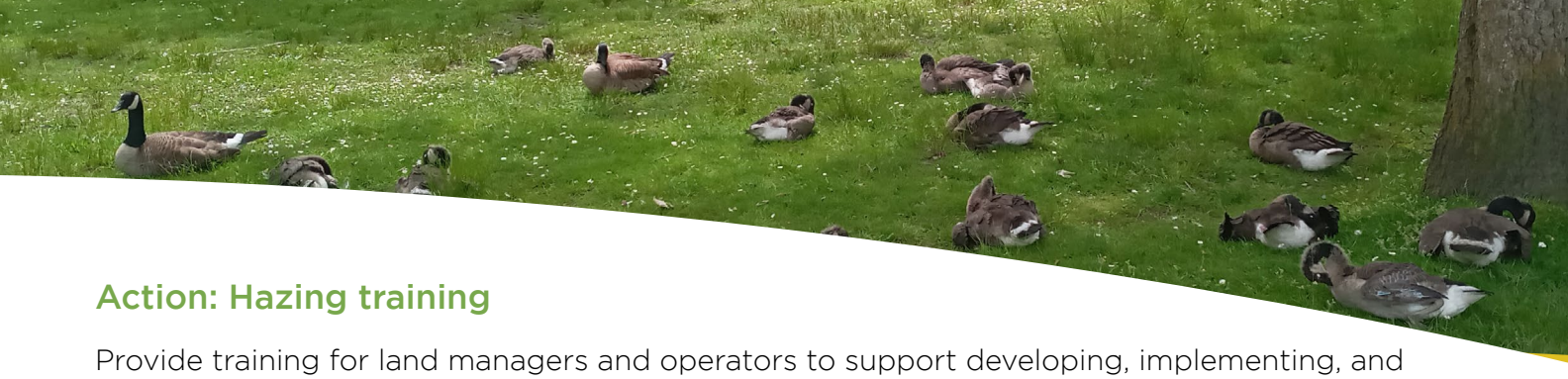
Pilot a coordinated hazing program within a defined area to determine what levels of effort and combination of techniques result in the best outcomes for target sites. Important considerations for such a pilot include taking advantage of economies of scale (i.e., addressing the largest number of geese with the fewest resources) and encouraging geese to move to and establish in operationally acceptable areas. A pilot provides an estimate of resources for a larger, on-going effective hazing program to prevent damage to the highest priority areas.

CASE STUDY

The City of Orillia employs several measures to prevent geese from congregating including a dog patrol, laser lights, avian distress calls, and pyrotechnics. This work has resulted in a 50% reduction in goose use at the controlled areas.

In Colorado, a private company provides a service involving chasing geese with trained dogs, a hazing technique supported by the SPCA. The City of Denver uses the Goosinator, a remote-controlled machine that chases geese from areas where they have high impact. To be effective on Denver's very large goose population, two Goosinators would have to be deployed twice per day, four to five times per week in combination with landscape modification (City and County of Denver, 2020).

Source: www.goosinator.com



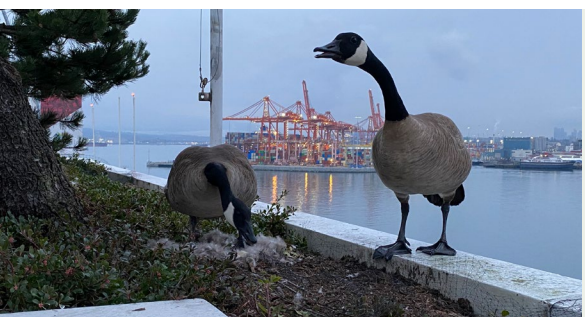
Action: Hazing training

Provide training for land managers and operators to support developing, implementing, and evaluating the success of hazing protocols specific to park sites and operational needs.

Action: Create refuge areas

Hazing at a particular site is effective if geese have an alternative suitable habitat to land where they are allowed to remain undisturbed: a refuge. Hazing is prohibited in refuge areas, so geese learn to avoid hazing sites and, instead, use refuge sites most often. To be effective, refuge sites have to meet the basic needs of geese including clear sightlines, grass for food, and access to water for drinking and safety.

Candidate sites: SE Jericho Park, Vanier Park lawns and pond, lawn to the west of lake at John Hendry Park. Candidate groupings of parks for coordinated hazing are described in Section 7.



In Fall 2022, in a workshop with Park Operations staff, areas where geese can and cannot be tolerated were recorded on a working map to help guide application of appropriate mitigation techniques at problem sites.

CASE STUDY

6.4 POPULATION CONTROL

Action: Egg-addling

Implement a sustained, annual program with immediate increase in eggs addled; this is necessary to slow or plateau population growth. The Park Board has conducted egg-addling for several years, and the level of effort has varied based on available resources; in 2021, the Park Board addled 660 eggs, an annual high over 25 years of data collection, with some years seeing fewer than 100 eggs addled.

Action: Hazing with kill-to-scare

Examine the feasibility and desire for assisting operators in appropriate areas with kill-to-scare permits.

CASE STUDY

The Okanagan Valley Goose Management Program has been in place since 2006 and supported the addling of over 20,000 eggs, an average of approximately 1,300 per year, preventing a total of 11-15,000 breeding geese and their offspring from entering the population. The Okanagan example demonstrates that an ongoing effort is required to curb the growth of the breeding population and prevent not just the population size, but the rate of growth, from increasing.

Action: Lethal removal

Examine the need and feasibility of managed lethal removals in Vancouver Parks following implementation and monitoring of other identified action items. A lethal removal program requires the Park Board to demonstrate, through the Canadian Wildlife Services permitting process, that other methods of population management are inadequate to prevent damage. Lethal removal may require several years to implement due to establishing relationships with necessary partners, the complex urban landscape of Vancouver, and the challenging distribution of the geese in the City. Other jurisdictions are working closely with non-profit societies and Host Nations to administer lethal removal that involves harvesting and preserving goose meat for human consumption.

CASE STUDY

On Vancouver Island, a collaborative and comprehensive program involving multiple mitigation measures including lethal removal by harvest has demonstrated some success.

The Guardians of our Salish Estuaries Society (GooSE) monitors damage done by Canada geese to sensitive sedge grasses that stabilize shoreline and salmon habitat and other important areas. In addition to egg addling and non-lethal mitigation measures, they perform goose harvests of up to hundreds of birds each year, with the resultant meat shared among local communities. GooSE's work also includes training members of Host Nations to harvest, addle and monitor. Members of the K'omoks Nation have spearheaded this work, worked alongside, and trained members of Wei Wai Kum, Snaw-Naw-As, Tsawout, Tsartlip, and Tla'amin to harvest, addle and monitor the goose population.

In 2023, GooSE's support will extend to the Capital Regional District where an annual budget of $237,000 is proposed.

6.5 MONITORING

Action: Ongoing and annual and/or seasonal population surveys

Systematic, seasonal population monitoring following repeatable protocols will provide the information needed to inform annual implementation planning and permit applications (e.g., Lauer 2022).

Action: Record processes and outcomes

Monitoring implemented mitigation techniques to understand their effectiveness, continued applicability, and need for adjustment provides the information necessary to inform a successful, long-term program. In addition, for techniques that require permits, ECCC will require a report.

Action: Record-keeping

Digitally recording monitoring data and housing these data in a central location so that records are easily searched or analyzed, and available to future users allows continuity from year-to-year and in the event of staff-turnover.

6.6 COMMUNICATIONS PLAN

Action: Transparent and proactive communication with staff and public

Park Board Communications staff work with staff subject matter experts to develop and deliver comprehensive messaging, and ensure all relevant staff (e.g., operations, recreation, planning) are informed of the messages and where to refer public or other staff for additional resources. An effective communication plan considers mitigation actions, long-term goals, concerns of public, Park Board requests of the public (e.g., no feeding, identifying nests on private property), goose welfare, and other topics that arise during program implementation.

Vancouver Parks Board Post

7.0 MANAGEMENT SCENARIOS

Long-term implementation and resource commitment will be required to achieve management goals. Two example scenarios with probably implementation timeframes are provided; however, as long as any geese are present in Vancouver, annual egg addling and other appropriate mitigation measures must be in place to prevent the population from growing and impacting green spaces and people.

Management Scenario	A	B
Goal	Stabilize population growth with a combination of addling and non-lethal techniques to reach an eventual plateau and then a decline in numbers if management activities are sufficiently maintained	Stabilize population growth with a combination of lethal removal (including addling) and non-lethal techniques to reach an eventual plateau and then a decline if management activities are sufficiently maintained
Timeline	**15 - 20 years**	**5 - 10 years**
Key Management Actions	• Increase annual egg addling to as many as 700 nests • Modify landscape and coordinate strategic hazing • Perform twice annual monitoring of population size, composition, and distribution, and manage associated data • Increase enforcement of the wildlife feeding bylaw • Prepare implementation plan (first year only)	• All management actions from Scenario A; plus • Lethal removal

8.0 MOVING FORWARD WITH A REGIONAL APPROACH

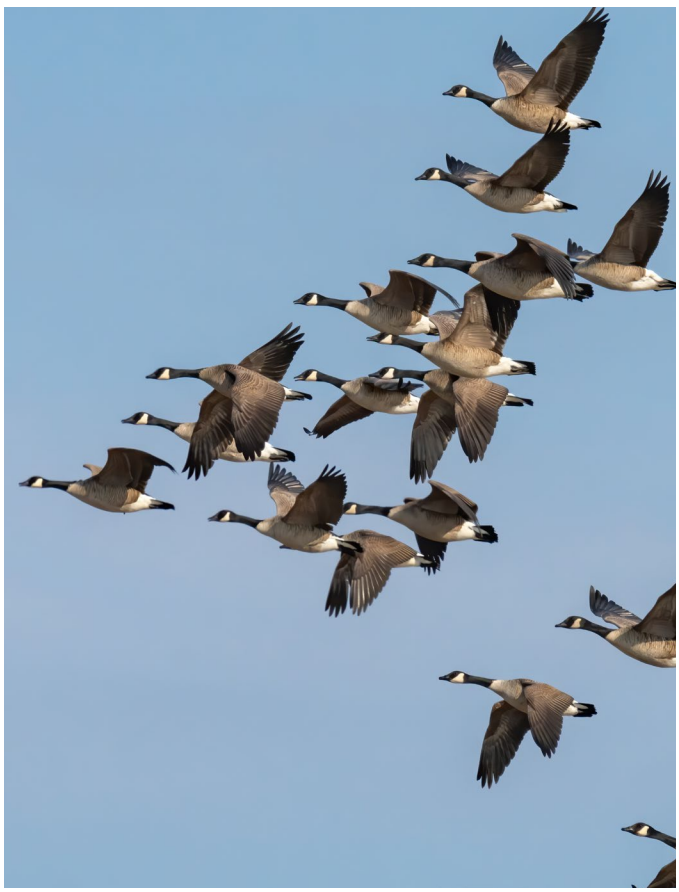
Canada geese occur in all Lower Mainland jurisdictions and, similar to Vancouver, many are challenged by the impacts of geese in parks and public spaces. **Canada goose management is most effective when conducted on a regional scale**, and Vancouver would benefit from collaborative management with other stakeholders. Example stakeholders could include:

- Metro Vancouver.
- Host First Nations.
- Associations (e.g., marinas, golf courses, tourism, Vancouver Harbour-based flight services).
- School Districts/Educational Institutions.Adjacent municipalities.
- Vancouver International Airport.
- Vancouver Coastal Health.
- Federal and provincial government agencies.
- Wildlife and Wildlife Habitat biologists/managers.

Actions:

Convene wildlife management staff from other jurisdictions in Metro Vancouver to share the Park Board's experience and the benefits of collaborative goose population management. Elements of a coordinated regional effort could include:

- Coordinated monitoring, enforcement, communications, administration and advisement to inform population control measures
- Regional funding structure (e.g., per capita representation from each of the stakeholder municipalities and a flat fee for non-municipal stakeholders) with committed annual line item in each jurisdiction's budget to support necessary long-term commitment to management
- Establishing a regional working group to guide long-term management across political boundaries and ensure community needs are met, Action Plan goals are advanced, qualified staff or contractors implement technical facets of the program as required, budgets are developed and adhered to, and the program is reviewed. Similar models include the Okanagan Valley Goose Management Program and the Vancouver Island Canada Goose Management Working Group.



Canada Geese in flight.

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