

INTEGRATED GOOSE MANAGEMENT PLAN (IGMP)
Developed for City of Santa Clara Central Park

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Introduction

The City of Santa Clara Central Park (Site) includes the Central Park Lake, surrounded by planted areas and grass that attract diverse and abundant bird species and waterfowl, including Moffitt's Canada Goose (CAGO (*Branta canadensis moffitti*)) that resides year-round at the Site. Over the past few years, the CAGO population has increased and produced excessive amounts of waste that exceeds the capacity of the daily grounds maintenance program to keep pathways, fields, meadows, and recreational amenities clean and sanitary for public use. This creates apparent physical, aesthetic and park user impacts, habitat and species impacts, and potential community health concerns.

The management activities of the CAGO are regulated by the Federal Migratory Bird Treaty Act of 1918 and subsequent revisions, and the U.S. Fish and Wildlife Service (USFWS). While the City has used various approved methods to deter geese, additional steps are needed to address the community's complaints and concerns, as well as to educate and inform policy and management practices that include the community's understanding and support.

To that end, the City has retained the services of avian biologist, Daniel Edelstein, who has specific Bay Area experience and who has developed this draft Integrated Goose Management Plan (IGMP) in order to provide community, staff and Council with research and information, and to propose effective strategies that protect the wildlife while reducing the increasingly negative and unsustainable impacts the CAGO have on the Central Park water quality, plants, pathways, recreational amenities, fields and visitor's park use.

Chapter 1

1.1 Integrated Goose Management Plan and Its Purpose

The purpose of an IGMP is to:

1. Communicate with the public issues related to the negative impacts associated with an overpopulation of CAGO in the City of Santa Clara (City), and specifically, the Site; and
2. Provide City Council population reduction management tool options for the Site and future sites as needed.

Negative impacts resulting from the CAGO overpopulation at the Site are outlined below. This IGMP provides a “blueprint” of short and long-term management options to decrease the CAGO’s roosting (resting without conducting an action), sheltering, foraging, and nesting success at the Site. More specific, the preventive and deterrent management options are tailored to the environmental, terrestrial/land habitat, and water conditions at the Site.

1.2 Negative Environmental and Aesthetic Impacts

This IGMP was initiated in response to the following problems caused by CAGO individuals present year-round at the Site:

- Degraded water quality at the Site is caused by as much as one pound of feces deposited daily by each CAGO. For perspective, consider a CAGO counting survey on January 10, 2021, that yielded the presence of 176 individual CAGO roosting on the lake or adjacent to it. The fecal load added to the lake can be extrapolated for daily, monthly, and annual totals based on the presence of 176 CAGO at the Site:

Daily: 176 pounds of feces are added to the Site.

Monthly (30-day Month): 5,280 pounds of feces added to the Site.

Annually: 63,360 pounds of feces are added to the Site

- Possible spread of avian diseases to native birds and, potentially, to humans.
- Reduced biological diversity as a direct result of water and habitat degradation due to overutilization of resources by the non-native invasive CAGO population.
- Inability or decreased ability to effectively filter the lake water as its quality degrades, including increased nitrogen and phosphorus levels from CAGO feces deposition stressing the effectiveness of the bio-filtration system, resulting in increased maintenance costs and potential need for replacement or upgrade before its end-of-life prediction.
- CAGO individuals’ instinctive behavior may periodically cause visitors to the Site (especially children) to be fearful when geese display aggressive behavior, sometimes in the form of hissing. In most cases, an aggressive goose will not flog people with their wings, peck with their bills, or bite. However, given the ongoing rise in population at the Site, encounters with CAGO individuals should be expected. Moreover, goose-visitor confrontations in the future are an unfortunate potential reality, if the current overpopulation of CAGO is not successfully reduced. CAGO attacks on Central Park visitors may occur based on reports nationwide where CAGO overpopulation in similar urban area parks have the same overpopulation dynamic.

Chapter 2

2.1 Natural History and Seasonal Migration

CAGO are considered a non-native and invasive species. CAGO populations became established by inadvertently flying to the Bay Area or were introduced here by people in the 1900s, eventually increasing its numbers in the Bay Area concurrent with its population rise throughout the majority of the lower 48 states.

CAGO's year-round residency at the Site is different from the majority of the five other subspecies (that are "first cousins" of CAGO) elsewhere in North America. CAGO that breed in far northern latitudes and may migrate south to "over-wintering" areas from southern Canada to several of the lower 48 states. The CAGO population at the Site may be joined by post-breeding populations that "over-winter" at Central Park before leaving again to breed elsewhere in the spring.

The location and quantity of CAGO at the Site vary by day and time. One reason for the variance is related to the species' seasonal behavior changes in the region, given some CAGO perform short-distance dispersal and migration after the breeding season to San Francisco Bay Area or other northern and central California sites.

The large CAGO seen at the Site are sometimes joined during the non-breeding season by two look-alike geese within the Cackling Goose species: the Aleutian Cackling Goose and the Cackling Cackling Goose (See photos in Appendix B.), both of which are subspecies within the Cackling Goose species. Note the repetitive common name of the Cackling Cackling Goose may falsely cause some readers to believe this is a typographical error.

The two smaller Cackling Goose subspecies are present at the Site only during the non-breeding, "over-wintering" season after which they migrate north to breed as far as Alaska. Thereafter, annually, from mid-March through September, all geese at the Site are the common, abundant CAGO. See Appendix B for more information about distinguishing the three "black and white," look-alike geese from each other at the Site.

Throughout the Site's Lake and its upland vicinity, CAGO is typically the largest bird species to visit the park. It is common to see large, communal gaggles of CAGO foraging or roosting together on the Site's sidewalks and lawn areas. Some gaggles exceed 25 or more individuals, especially after the breeding season. Case in point is the aforementioned 176 CAGO seen at the Site's Lake area on 1/10/21, which is the greatest number of CAGO the Avian Biologist, Daniel Edelstein, has seen since he began visiting the Site in 2019.

In the last few decades, CAGO has become more common as a breeding species in the South Bay, including the Santa Clara region. Although CAGO is not a native breeding species in Santa Clara County, it most likely began nesting on the peninsula at the Site within a few years after its construction, given this species has increasingly bred throughout the South Bay since the late 1970s.

Bird watchers initially began documenting breeding CAGO along several portions of the South Bay by 1988, after only rarely and periodically witnessing this species prior to the late 1970s. Additional details gleaned from William G. Bousman's account in the *Breeding Bird Atlas of Santa Clara County, California* (2007, Santa Clara Valley Audubon Society) state that local CAGO populations increased by about 30% per year in the South Bay since annual breeding began in the region during

the late 1980s. Before CAGO became established at the Site, nesting CAGO individuals were found at several relatively near lakes in the eastern foothills, including Lake Cunningham by 1989 and at Grant Lake by 1990. Breeding farther south occurred at Almaden Lake in 1991, at the Ogier Avenue ponds in 1993, the Parkway Lakes in 1996, and the Los Gatos Creek percolation ponds in 1998.

One of several subspecies (races)¹ within the Giant Canada Goose species, the CAGO at the Site looks like the other look-alike Canada Goose subspecies that occur elsewhere in the lower 48 states. On the West Coast, throughout most of California, and at the Site, the CAGO subspecies exists as a year-round resident. In North America (north of Mexico), numbers of CAGO have risen during the last half-century. Numbers of the CAGO population have increased approximately four-fold to more than 3.9 million in 2008 from 1 million birds in 1990². At the Site, ongoing informal surveys by Department staff and formal surveys by Avian Biologist, Daniel Edelstein, indicate numbers of CAGO continue to rise. A CAGO counting survey at the lake on January 10, 2021, yielded the presence of 176 individual CAGO at the lake area. This is a typical number for recent Central Park CAGO counting surveys; CAGO breed on the peninsula at the Site.

Despite its common presence at the Site, and throughout urban areas where this CAGO subspecies occurs in the USA, CAGO is protected by state and federal regulatory measures. The State of California and federal regulation measures prohibit killing or capturing CAGO or damaging, destroying, removing, or disturbing their nests, except as provided for under the Depredation Order (DO) permit (See Appendix F) obtained on behalf of the City, per the Agreement validated by the City. A DO provides regulatory authorization under the Migratory Bird Treaty Act (MBTA) to conduct specific migratory bird depredation management activities without the need for an individual federal permit.

2.2 Nesting Behavior and Habitat Preference

CAGO nest in diverse natural and urban habitats, choosing nesting sites such as wetlands, reservoirs, industrial park lakes (within which islands occur as prime nesting spots), and saltwater marshes. In most cases, they nest on islands, dikes, and uplands in marshes where vantage points provide them visual protection from ground predators such as marauding raccoons, opossums, striped skunks, gray and red foxes, and bobcats.

Breeding occurs during year number two or three of a CAGO's life, and egg-laying sometimes commences as early as March at the Site with its annual nesting cycle typically complete by no later than mid-June. Often reusing the same nest site from one year to the next, females have one clutch per nesting season and lay between two (2) and twelve (12) creamy white to pale-tannish white eggs in each clutch, with 5.5 eggs the mean per clutch. Eggs are laid throughout the day, with most dropped in the afternoon and evening. Nest vegetation may stain the eggs during an incubation period which lasts 25 days. Within 24 hours after hatching, goslings can walk, swim, feed, and dive. Goslings remain with the parents for approximately one year after birth.

Dames (female) incubate the eggs while ganders (male) primarily stand guard. While tending newborns, both ganders and dames stand nearby in alert postures. Adults without young spend more time resting and preening than do adults tending to young.

¹ See Glossary below.

² U.S. Fish and Wildlife Service. 2000. Waterfowl population status report. Dept. of Interior, Washington, D.C.

From late winter through spring, breeding adult CAGO become more territorial. Many will leave flocks in search of suitable nest sites. After a nest is established, the gander will defend its space in the vicinity of the female.

CAGO form monogamous, stable pair bonds. Long-term pairing is typical, but a new mate may be required for a goose that loses its mate. The timing of pairing is little studied but appears to occur from late winter through spring. Copulation occurs both before and after nest site selection. Multiple, “extra-pair copulation” mating may occur among males and females during the nesting season, though bonding between a single male and female remains intact after they establish a nest site together.

Family bonds (that include the gander, dame, and goslings) are typically maintained throughout the first year of formation, with some yearling contact afterward. Predation is limited at the Site, especially upon nests on the Lake’s peninsula. Elsewhere, egg predation may come from Common Raven, American Crow, Gray Fox, Coyote, Raccoon, and Striped Skunk.

Beyond their strong flying ability, CAGO individuals move throughout the Site as both walkers and runners. In so doing, they easily traverse the variety of challenges that confront them, whether it’s scaling the small waterfall adjacent to the peninsula or leaving and entering the lake. When flying, geese often do so in groups at the Site, though not typically in “V” formation, as seen among the migrating wild Canada Goose. Most often, flight occurs as they move among foraging areas at the Site, in addition to leaving for nearby roosting habitats, such as Central Park Elementary School’s yard across from the Community Recreation Center.

Preening, stretching, bathing, and many other self-maintenance activities are regularly seen in CAGO at the Site. Other behaviors may serve as signaling purposes. As a courtship ritual, geese at the Site shake their body, head, and tail, especially after copulation or bathing. Cleaning movements include scratching of the head, neck, or cheeks with either foot; nibbling feathers and feet; and circulating air or water through a submerged bill. Feather maintenance is achieved by geese spreading oil from a gland onto their feathers via their bill or by rolling their head onto the back, flanks, and feathers. Bathing includes head-dipping, which moves water over head, neck, and back, and, during more intense bathing, wing-beating, and flailing of water and occasionally somersaulting is seen. CAGOs also display diving and dashing habits among flock members.

CAGO sleep and rest standing on one or both legs with neck bent and head held low above their chest, or with it stretched back between their upper back feathers. Often, sleep occurs while a goose is floating (even in deeper lake water) and sometimes in large groups. At night, geese at the Site often retreat to the lake peninsula.

2.3 Understanding Population Increase

Ecological issues related to CAGO in the SF Bay Area are ubiquitous in areas that offer habitat conditions like those present at the Site. In recent years, increased breeding success among CAGO has been documented throughout the Bay Area.

Reasons for this increase relate to the diet of CAGO; it is an herbivore, feeding primarily on plants. Post-fledging and during fall and winter, many CAGO rely primarily on foods higher in carbohydrates such as berries or seeds. More typically, CAGO have become acclimated to nearby habitat sites that are within easy flying distance from the Site and where large groups may return. This results in optimal roosting, foraging, and nesting habitat conditions at the Site.

Equally important, CAGO are attracted to the Site's environs because year-round open water occurs next to the lawns surrounding the park's lake. Beyond serving as a source of grazing, the peninsula hosts plants with blossoms and leaves eaten by the geese.

CAGO have an innate preference for living in open terrain offering good visibility and sightlines to notice any potential approaching predators: The lake peninsula is out of harm's way and fulfills this innate preference. Furthermore, conditions at the Site provide an ideal "nursery" setting for adults to safely foster and nurture newborn CAGO, allowing them to flourish in large numbers at the Site compared to the wild where mortality from predation would limit CAGO presence.

Given the optimum water and food conditions at the site, the majority of the Site's CAGO may never disperse or migrate from the Site. If they leave the Site, it's likely to nearby South Bay and other San Francisco Bay habitat. Individual CAGO that leave may also return, especially during the breeding season when Central Park and its lake serve as safe harbor.

If too much competition from other CAGO occurs within Central Park and on the peninsula, it's possible the newly arrived CAGO may roost/shelter at the Site to forage on vegetation and the lawns but breed elsewhere within or near Santa Clara.

Chapter 3

Seasonal and General Management Techniques to Control the Nesting Habits

The different time periods below serve to remind City staff of recurring annual recommended actions needed to ensure short and long-term reduction of CAGO numbers at the Site. Successful completion of these seasonal techniques ensures short and long-term reduction of CAGO at the Site.

3.1 March: Addling Eggs

Failure to begin addling eggs annually in March will result in more management challenges from April through June because eggs laid by CAGO in March typically hatch within 25 days. Consequently, controlling the goose overpopulation at the Site by punctual addling their eggs during peak egg-laying months is critical to reducing their numbers because adults are reluctant to leave eggs and young behind after newborns hatch.

Regulatory note: The DO permits addling of eggs before they hatch and does not allow for lethal measures to eliminate hatchlings. See Appendix F for details related to how Central Park and the Santa Clara Parks & Recreation Department are registered as an approved site for the addling of CAGO eggs based on its approved status with the US Fish and Wildlife Service.

3.2 March Through June: Nests Removal

The CAGO breeding cycle is to initiate nesting in March and April; it is important to plan so courtship and nesting behavior is altered. Management techniques outlined in Chapters 3 and 4 of the IGMP should be conducted during these months.

3.3 Summer Through Mid-Autumn: Irrigation Monitoring for New Plantings

June through November, CAGO remain at the Site, often roost, and forage in large flocks that include two or more families that “band together.”

It is important for City staff to continue collaboration with an Avian Biologist, to plan, assess and determine if implemented management strategies have succeeded in the previous months. Management actions that have failed or need improvement should be reassessed and revised.

As plantings take root and succeed at the Site, a coordinated irrigation plan must be established and periodically reviewed by the Avian Biologist and City staff. The peninsula is on a separate irrigation zone from the rest of the Site’s irrigation system; therefore, criteria and parameters must be determined to set and monitor irrigation schedules to ensure successful plant establishment.

3.4 Year-Round: Discourage/Prohibit Feeding

Visitors feeding wild birds have been observed at the Site. Such behavior encourages CAGO to remain at the Site year-round. CAGO will be less likely to abandon the Site if visitors continue to feed them. This precept is especially important because when the diets of geese are not supplemented with handouts and they must depend on limited natural food supplies, geese may move elsewhere.

In addition, feeding geese with artificial foods, like bread, can be detrimental to their health. Studies indicate wild birds fed by visitors, even rarely, learn to depend upon handouts. Forced to forage for themselves, some birds are less than able to survive when stressed by the rigors of living in the wild. Other potential negative impacts of feeding wild birds in park settings such as Central Park include the potential for increased disease spread among CAGO and other bird species that associate with them (such as the large population of Mallard that inhabit Central Park year-round)³

City staff may wish to further develop and expand educational messaging to park patrons, so they learn about problems resulting from the feeding birds at the Site.

3.5 Reduce Attractiveness of Foraging and Nesting Habitat

CAGO at the Site become accustomed to feeding in the same spots where they sometimes establish territories and groups. CAGO begin to search for prospective nesting sites in late winter. A bonded pair of geese will seek a flat, open area (such as the lake's peninsula) for nesting as early as March.

City staff may wish to consult and implement one or more portions of the planting plan featured in Appendix A. It is advised that completion of planting recommendations in Appendix A are intended as short-term and long-term solutions to reduce CAGO nesting success, as well as non-breeding season presence of CAGO at the Site.

The Site's Lake peninsula is the focal point of the Site where the IGMP planting plan elements should be implemented. There would be a predictable decrease in documented goose nests at the Site if the prescribed plant options in Appendix A were accepted and installed on the peninsula. Timing of the planting is also addressed in Appendix A.

3.6 Monitor CAGO Behavior for Future Management Action Decisions

Given CAGO typically form large groups after nesting is completed, by mid-summer, management tactics should be enacted as a preemptive response to discourage CAGO from remaining at the Site. Starting in early May, City staff should monitor and review the success of management actions taken in March through June and coordinate with a qualified Avian Biologist to plan management actions and obtain approval for additional site visits with the intent of reducing CAGO presence at the Site.

³ See: <https://www.wildlifeonline.me.uk/questions/answer/is-it-okay-for-me-to-feed-wildlife>

Chapter 4

Introduction to Non-Lethal Options for CAGO Population Reduction

Due to US Fish and Wildlife and regulatory guidelines, non-lethal management options are the only available choice for reducing the CAGO population at the Site. The right to possess a DO permit has been granted to Avian Biologist Daniel Edelstein on behalf of the City so that he is able to help reduce the Site's CAGO population. The DO allows an Avian Biologist to implement the subsequent CAGO management option of addling CAGO eggs by coating the eggs with corn oil or similar product, thereby restricting gas exchange and respiration which results in a non-viable egg.

4.1 Husbandry Methods

Groups of CAGO often are seen in large congregational groups at the Site near the lake. As discussed in Chapter 1, CAGO in urban areas such as Central Park typically gather near bodies of water where easy access to adjacent foraging areas exists.

The number of CAGO at the Site may be reduced by implementing several management tactics. It is advised that City staff reduce or eliminate the fertilizer, applications to the lawns surrounding the lake. Reduction will decrease the growth of grass and, also, reduce the nutritional quality of the grass CAGO consume in a nearly unlimited supply at the Site.

Other techniques for the City to consider include:

- 1) reducing or eliminating all mowing of the lawns within 75 feet of the lake's edge,
- 2) reducing the total amount of lawn area between the sidewalk that surrounds the lake and the foraging area (the lawn),
- 3) limiting irrigation so less growth of the lawn occurs which would in turn make the grass less palatable to CAGO (i.e., "limiting" is offered as a management technique option because "brown lawns" would not be aesthetically pleasing to visitors, and
- 4) reviewing Appendix A that features a planting plan for the Site, including suggested plant species that would reduce the amount of lawn cover at the Site.

4.2 Other Site Specific Non-Lethal Methods

Non-lethal deterrents are divided into two main categories:

- Devices that scare CAGO, and
- Physical deterrents.

Scare devices frighten CAGO so they leave areas such as Central Park's lawn areas (and the lake). Physical deterrents prevent CAGO from gaining access to an area, such as the Central Park Lake. In this case, City staff should note this IGMP limits its recommendations to physical deterrents.

Scare strategies are not considered in this IGMP because some visitors would likely complain to City staff that undue emotional hardship or harassment is not an appropriate CAGO reduction tactic. In fact, in several USA locations where dogs were employed to chase CAGO from foraging in an area, the public commented that this tactic was "cruel", and therefore unacceptable. Equally important, employing dogs to scare CAGO is often merely a temporary deterrent to reduce the number of CAGO visiting a Site; scared off CAGO continue to monitor favorite sites (such as Central Park) and as soon as the dogs are removed

from the area and the threat no longer exists, CAGO are likely to return.

Hazing tactics (such as cannons, whistlers, noise bombs, shellcrackers, banger rockets, or other noisemakers) utilizing repeated loud sounds is another harassment option but is not recommended due to the impact on park visitors.

Visual frightening devices sometimes work, given that CAGO see, recognize, or interpret, and react to an image or object that represents a potential threat to them. Although these devices are typically silent and inexpensive, they often are ignored by CAGO after a while or work best when used in combination with another reinforcement deterrent (such as the DO that permits CAGO addling throughout Central Park during the CAGO breeding season). One example of a visual frightening device is Mylar reflective tape (i.e., tape is often red on one side and shiny silver on the other; it is strung between posts to form a fence or attached to a pole as streamers, thereby creating glints of sunlight that visually flicker in the breeze. As a result, startled CAGO fly away. This tactic is not recommended as an option because the serenity of the Site would be violated.

New CAGO deterrent devices have recently entered the market. One of them utilizes pressurized water sprayers and motion detector technology to deter geese from entering a lake or another water source. These devices are hooked to hoses and activate when the motion detector senses the approach of an animal. Again, this technique is deemed unacceptable for Central Park because people or their pets could potentially activate a sprayer, thereby causing unacceptable commotion.

Physical structures can be put into place that will impede movement of geese from their resting or flocking areas toward feeding areas. Such barriers can be created using vegetation, fencing, or rocks. See Appendix A for a planting plan that would serve as a physical structure option to reduce CAGO's ability to roost and forage amid the lawns at the Site. The addition of plants noted in the Appendix A planting plan would block CAGO walking pathways.

Installing fencing is another management option City staff should utilize as an addition at the Site. See Appendix C for materials that possess a suitable design compatible with the rocky/cobbled shoreline and sidewalks present around the lake's perimeter at the Site.

The Site contains the Central Park Lake which is not a natural body of water and must be continually replenished with water. As part of ongoing management strategies to conserve water, the Central Park Lake may be drained seasonally from early July to mid-September, which is more consistent with reduced water levels in natural bodies of water in the Santa Clara Valley region. Having a dry lake during the middle of the summer would also reduce the number of CAGO at the Site.

Chapter 5

Population Monitoring After Implementation of Management Options

Currently, a monthly, year-round survey of CAGO occurs at Central Park. This survey informs City staff of the CAGO's total numbers at Central Park. This information is crucial to inform management decisions for several reasons:

- Assessing and ensuing management actions are enhanced by knowing CAGO distribution patterns in relation to when they visit the Site.
- Knowing exactly where CAGO roost, forage, and nest; and
- Determining when key CAGO activities commonly occur and when numbers decrease; and the total numbers of CAGO on the Site.

It is advised that a trained, professional Avian Biologist continue to conduct the monthly survey to ensure accurate information is collected. Most important, this information must then be interpreted in terms of presenting City staff management options for review and potential implementation at the Site.

Chapter 6

6.1 Public Outreach

To educate the public about the overpopulation issues and to increase their understanding about why the City is implementing CAGO management actions, the Director of the Parks & Recreation Department may consider authoring research and best practices-based article in local print and/or online media platforms. The article will help ensure transparency when employing non-lethal CAGO overpopulation management actions. Additionally, it will preserve the public's favorable image of the City while providing important information and seeking comments from the public and visitors who frequent the Site. The article perspective may be especially helpful for CAGO enthusiasts to understand issues relating to CAGO overpopulation, such as previously mentioned fecal deposition, encroachment upon the functionality and aesthetic appeal of the Site, and increased maintenance costs to the City.

Public education about CAGO should be initiated by the City before management actions occur for the purpose of:

1. Ensuring an open and transparent communication between the City and the public before one or more non-lethal overpopulation management actions are employed, including habitat alteration management actions.
2. Accommodating an anticipated public reaction to management decisions affecting the welfare of CAGO at the site. More specific, some visitors may provide comments in favor of preserving the extant bird species' populations, even though CAGO is a non-native nesting species whose overpopulation at the Site qualifies it as an invasive species.

It is recommended when developing educational materials/media for the public, that the City staff and the Parks & Recreation Commission know basic facts about CAGO and its natural history, nesting cycle, etc.

6.2 General Education for the Public

- A fact-based article written by the Director of Parks & Recreation, or appropriate designee, should be submitted to local newspapers and appear on the City's web site. The article should be on file with the City and accessible at any time. This informational piece should serve as an update to the public regarding the overpopulation of geese at the Site and the negative impacts they are causing. In turn, with the local Audubon chapters support, it is likely ongoing community awareness and engagement will be fostered with commensurate support for goals related to CAGO reduction efforts
- The article should be sent to the Director of the Santa Clara Valley Audubon Society. In addition, follow-up communications to the Director are recommended to garner support in the form of a resolution in support of the City's IGMP including the addling of CAGO eggs. In turn, this letter should be used in communications to promulgate the City's IGMP to the public including City of Santa Clara commissions, committees, and board etc.
- Letters should be sent to local politicians and community groups notifying them about the problems associated with the overpopulation of geese at the Site and why City staff must respond with management actions.

- On an as-needed basis and to maintain support for efforts to reduce the site's goose population, City staff may host politicians and other important community decision makers to report on the progress. Observation about the progressing planted vegetation would be highlighted during a walking tour, along with "before and after" photo handouts that show the success of the planting program as the site's habitat quality evolves from one year to the next. In so doing, public opinion and local laws and regulations are more likely to remain consistent with the management action goals established for the Site.
- Announcements and information such as signage should be added to visitor entry points at Central Park. A photo montage on the City's web site and on signs at the Site in Central Park will help visitors identify the reasons why the City is addressing the CAGO overpopulation problem with non-lethal management strategies intended to reduce their population. Other signage could alert visitors to the difference among the invasive, non-native CAGO and two look-alike Cackling Goose subspecies/races that visit the Site. In addition, information on signs should alert visitors to reasons why feeding geese may adversely affect their health.
- The City's website should feature ongoing education information about the geese, much of which is included in this IGMP.

6.3 Adult and Youth Education Actions

- Add information to the City's website to help teachers learn about the problems related to CAGO at the site so they can educate their students.
 - When school field trips occur at the Site, provide students with an informational handout that will help them understand the problems associated with geese and how students can help.
 - Ensure the informational signage at the Site is presented at a level that is comprehensible to youth and their parents. Information should be written in a manner that encourages adults to engage in conversation with younger visitors. Graphics should be utilized to facilitate comprehension for all ages, and all visitors regardless of language, fluency, and literacy.
- Public presentations via Zoom are currently advised to alert the public regarding the City's chosen CAGO non-lethal overpopulation reduction methods. After COVID-19 restrictions are relaxed or removed, in-person public presentations should be offered at least once a year, especially during the nesting season when visitors may see an Avian Biologist at the Site addling eggs.

Appendix A

A1 Planting Plan

To reduce the overpopulation of CAGO at the Site, a planting plan is recommended. The plan includes a recommendation of botanical species and corresponding areas for plantings at the Site.

Note: The recommended prescription of botanical species and their placement is subject to change based on potential comments from City staff. This section also highlights post-planting care and erosion control, in addition to suggesting a “Success Criteria.” Planting local native species are recommended.

The species prescribed in this plan are intended to either replace or add vegetation to areas where they will grow at least 24 inches high and dense enough to prevent geese from seeing through. Based on the prescription plan below, each vegetative barrier should be at least 25 feet wide. Most plantings should be arranged as groupings with ample large expanses of existing lawn left intact to account for the annual Art & Wine Festival where exhibits/stages are placed. The chosen metric of 25 feet or more is suggested to reduce the suitability of the lawn areas as roosting/foraging places for geese to “hang out” at the Site, and to reduce their presence at the Site.

A1.1 Locations Designed for Planting at the Site

A1.1a Peninsula Within Central Park’s Lake:

The following plant species are advised to be planted by City staff no later than February 2023 under the supervision of a qualified biologist or an ISA Certified Arborist in the Parks & Recreation Department. Species are chosen because they require minimal irrigation and because they grow wide and dense close to the ground to reduce CAGO’s interest in frequenting the Site’s lawn areas because CAGO individuals prefer open areas where they can see in all directions for the potential presence of nearby approaching predators.

- *Baccharis pilularis* var. *consanguineum* (Coyote Bush)
- *Rhamnus californica* (California Coffeeberry)
- *Quercus agrifolia* (Coast Live Oak)

A1.1b Selected Portions of the Lawn Areas Surrounding the Lake:

A ring of densely planted shrubs consisting of the two species mentioned in A1.1 above should be added to the lawn area where the outside border of the sidewalk exists that surrounds the lake. The shrubs should be five-feet wide and be planted around the entire circumference of the lake except for gaps of four feet every 100 feet so people can enter and leave as they move from lawn areas to the sidewalk and vice-versa. This habitat alteration technique will reduce CAGO’s interest in congregating en masse in the lawn area. In effect, CAGO are unlikely to use the four-foot-wide gaps to walk from the lake into the lawn areas and vice-versa, if all the gaps only occur every 100 feet in the line of shrubs surrounding the lake.

A1.2 Quantity and Percentage for Vegetation Cover

For the Peninsula:

Shrub Species*	Percent to Plant	Size of Container
Coyote Brush	50%	20# "D-pot" buckets (2.5" x 10" deep)
California Coffeeberry	40%	10# "D-pot" buckets (2.5" x 10" deep)

Tree Species	Percent to Plant	Size of Container
Coast Live Oak	100%	3# "Tree pot" buckets (4" square x 14" deep)

For the lawn areas:

Shrub Species*	Percent to Plant	Size of Container
Coyote Brush	70%	20# "D-pot" buckets (2.5" x 10" deep)
California Coffeeberry	30%	10# "D-pot" buckets (2.5" x 10" deep)

* Once established, both above shrub species require only minimal periodic irrigation, thereby reducing maintenance costs. Although no additional irrigation hardware system will need to be added to the lawn area, a watering schedule will need to be created and followed via coordination with Parks & Recreation Department maintenance staff.

A1.3 Quality of Vegetation Stock Purchased

Each plant shall be purchased only after clear verification of species, purity, percent germination, dealer's guarantee, and dates of test.

A1.4 Spacing of Plant Species Per Acre

All plant species (see above, A1.1) should be planted on 15 ft centers. For every four Coyote Bushes planted, two California Coffeeberry should be planted equidistant and between the two closest Coyote Bush plants. For every five Coyote Bushes planted, Coast Live Oak tree should be planted equidistant from the Coyote Brush and California Coffeeberry. Utilizing this design, the entire planting site will have equal distribution of the three plant species.

A2 Care and Erosion Control

A2.1 Preparation of Planting Areas

Plants shall be installed in a finely graded soil after the designated lawn areas have been adjusted in size to accommodate the new planting. Soil should promptly be planted and not left barren, so the newly exposed soil remains friable and weed-free. If planting area is compacted, loosen the top six inches of soil to create favorable conditions for establishment. Remove soil lumps, ridges, and depressions. Remove deleterious material.

A2.2 Weather Limitations

Preferably, planting shall occur in November and December within five days after a major rain event exceeding 0.5" of rainfall confirmed by utilizing an online weather station source (e.g., weather.com, accuweather.com or the National Oceanic and Atmospheric web site specific to the Santa Clara region).

Soil should be moist within the to the top six inches of the soil profile. If no rain events occur in November or December, supplemental irrigation or manual watering may be necessary during the establishment period. Collaboration with the qualified biologist is suggested to monitor plant establishment and assure a higher survival rate based on knowledge and awareness of the planted species and their water requirements.

A2.3 Equipment

The selection and usage of proper equipment is important in preparing the areas at the Site for planting without causing compaction or compromising soil structure within the revegetation zone.

A2.4 Geotextile Application/Surface

To prevent erosion of ground surrounding plantings, where slope orientation is more than 5%, geotextile material such as rice mats should be placed around and within the planting areas as approved under the supervision of a qualified avian biologist in consultation with appropriate City staff. In addition, the biologist and City staff should mutually agree on which water erosion control devices would be necessary to add to the Site. Options for erosion control include hay bales, rice mats, straw wattles, and other natural erosion control materials. The goal is for the chosen erosion material to limit down-slope loss of soil and mulch that will be applied around each new plant.

A2.5 Protection of Plantings During and After Establishment

Several common, standard plant protection actions should be implemented at the Site after a planting occurs. One option would be for City staff to add dense mulch at the base of shrubs and trees. When appropriate shrubs and trees should be protected at their base by adding wrapping tape and/or creating wire mesh enclosures to an appropriate height to prevent foraging by rodents and brush rabbits. (See photo to the right.)



A2.6 Best Management Practices in Relation to Plantings at The Site

Although it is unlikely a Storm Water Pollution Prevention Plan (SWPPP) will be necessary at the Site, it is advised that the City consider having a qualified biologist or an ISA Certified Arborist create a list of acceptable Best Management Practices (BMPs) intended to prevent erosion at planting sites throughout the Site. This one-time action will serve as a long-term guidance reference for City staff, thereby increasing the chances for plantings to flourish.

A3 Success Criteria

A3.1 Final Success Criteria for Vegetation in Disturbed Soil Areas

Successful criteria for evaluating revegetation zone plantings shall be initiated and developed by a qualified biologist in collaboration with Parks & Recreation Department ISA Certified Arborists for the revegetation zone plant establishment.

After the project, the biologist and ISA Certified Arborist would determine if plantings completed under a planting plan were properly established (see 4.2-4.4.4, below), and confirm that any further maintenance or alteration to the vegetation would be subject to mutually agreed upon criteria established by the qualified biologist and the City.

A3.2 Monitoring Vegetation in Newly Planted Areas and Disturbed Soil Areas

The successful evaluation of the revegetation zone planting based on established criteria shall be assessed regularly by the qualified biologist in consultation with City staff. Evaluations should take place eight months after the initial planting, and as needed to evaluate the health and vigor of the plantings after the first inspection.

The biologist should develop conclusions and recommendations based on periodic visits to the Site and submit written appraisals for each site visit. The appraisal should include suggested budget items that may need approval by the City (e.g., replacement plant purchases for mortality of initial plantings and additional equipment City maintenance staff may need to obtain).

A3.3 Time Limits for Final Success Appraisal of Plantings

Criteria to evaluate the final success of revegetation zone plantings shall be provided by the qualified biologist in consultation with City staff. Final success time-limits are addressed in section A3.4 below, along with advisory actions the City should consider implementing based on the level of successful plant establishment at the Site.

A3.4 Criteria to Evaluate the Successful Establishment of Plantings at the Site

It is anticipated that initial short-term successful establishment of plantings will yield timely benefits for the immediate reduction in CAGO numbers based on:

- Decreasing the lawn area (food source) footprint so fewer CAGO visit the Site to roost and forage in contrast to the currently expansive lawn along the circumference of the lake.
- Creating a visual barrier with shrub plantings that changes the behavior of CAGO as they are less likely to move around the lawn areas surrounding the lake. It is expected that fewer large groups of CAGO would roost while sitting on the grass together. Ultimately, the addition of shrubs throughout several portions of the lawn would potentially cause CAGO to reduce their presence from roosting near shrubs and prevent them from easily entering the lake unimpeded via lawn roosting areas.

- CAGO vacating entire sections of the lawn where shrub plantings are added and “bunched” closely together to form a maze-like, circuitous pathways. CAGO individuals and groups may no longer have open sight lines to detect potential predators such as coyotes and gray foxes although none have been seen at the Site. Instead, it’s the “perceived threat” and inborn, innate behavior of CAGO to avoid areas where no easy escape exists and where obstructed visual sight lines occur.

Long-term benefits of adding plantings to the periphery of the lake area are more challenging to predict. If successful reduction of CAGO at the Site requires a longer time frame than anticipated by City staff, it’s important to continue ongoing adding of remaining CAGO that create nests at the Site. Throughout the process of managing CAGO, annual maintenance and repair must continue until successful progress occurs in reducing CAGO’s presence at the Site.

A4 Monitoring and Evaluation Requirements

To ensure the increased survival success rate of the plantings, a qualified biologist should visit the Site to evaluate the planting areas three times a year upon final approval and implementation of the IGMP:

Site Visit #1) An April site visit to assess whether plants are exhibiting new growth.

Site Visit #2) A June visit to evaluate the results of irrigation strategies and practices on planting areas. All plants shall receive sufficient water to promote vigorous root and canopy growth, as well as plant health, according to the normal growth habit for each species as judged by the biologist or Parks & Recreation Department staff who are ISA certified arborists

Site Visit #3) An October visit to assess the vigor of plants after the summer when potential stresses (drought/no rain, wind, erosion, etc.) may have impacted revegetation zone plants. The qualified biologist or ISA Certified Arborist may recommend corrective measures to mitigate plant loss because of poor vigor or stress, such as manually watering. Individual plants should receive sufficient water to hydrate the soil and stimulate healthy root and corresponding canopy growth.

All visits by the biologist should include a quantified number of replacement plants needed to mitigate plant loss. The budget established and allocated by the City for the planting plan should account for a 10% mortality rate, which is common within the landscape industry.

At each site visit, the biologist will submit a “Monitoring Report” that will track the success or failure of the planting effort. The biologist visiting the site must assess the effectiveness of the erosion materials according to their performance specifications. All procedures recommended by the biologist to address problems in the planting areas should be evaluated collaboratively with City staff, ensuring both parties are aware of the planting effort’s success and necessary future actions to safeguard ongoing, long-term success of the planting endeavor.

The annual due date of report submittals should be by no later than October 31 after the final approval and implementation of the IGMP. The cover letter transmitted for each report shall include a site summary and appropriate comments, in addition to a figure that corresponds to numbered individual plantings so that successfully established and thriving plants are identified as well as dead plants that must be replaced.

Ongoing procedures should include photographic documentation to support the assessment. The biologist shall determine if any maintenance, repair, or revegetation actions are required to meet final success criteria. The assessment shall determine whether maintenance or repair work is required. Final success evaluation (see section 4.4, above) shall be determined by the biologist in collaboration with the City.

A5 Maintenance and Repair of

Revegetated Areas

The City will maintain and repair the new vegetation and mitigate erosion based on recommendations made by the biologist. During this period, the site should not require significant maintenance measures. Adequate water is anticipated from normal rainfall. Weed control is not anticipated because each planting should be planted with three inches of organic mulch that will help reduce moisture loss from the soil in addition to reducing weed emergence and growth. However, if weed coverage exceeds 20% of the area surrounding an individual plant at the Site, then the biologist's report should recommend appropriate response actions for City maintenance staff.

A6 Contingency Measures - Natural Disasters and vandalism

During the period prior to achievement of final plant establishment success of the new vegetation, City staff shall make a thorough site inspection following any flood, earthquake, fire, or act of vandalism that may adversely affect the integrity of the planting areas at the Site. An inspection report with photographs and required repairs, and a schedule to complete them, should be prepared City staff.

Appendix B—Photos of the Three Look-alike Geese Species



Moffitt's Canada Goose
(Branta canadensis moffitti)

Common in Central Park, often present. Year-round resident.

Large body (30-43"), big bill, often in large groups; present year-round at the Site in large numbers.

Watch for Moffitt's Canada Goose on the lake peninsula in Central Park where most nests producing newborns appear from as early as March (& through June annually), thereby adding to the overpopulation load that already exists from immigrant and past year's Moffitt's Canada Goose births at the Site.



Aleutian Cackling Goose
(Branta hutchinsii leucopareia)

Rare to absent at Site. Most are larger bodied than Cackling Cackling Goose (22-30"), with paler breast usually gray-brown to dark brownish; white collar usually complete and thick with blackish feathering at base of neck; square head; bill short, tapering to narrow tip and somewhat pointed; white cheek patches; usually with black throat stripe. Only at the Site during the winter/non-breeding season.



Cackling Cackling Goose
(Branta hutchinsii minima)

Rare to absent at Site. Smallest body of the three look-alike geese (23-26"); small bill is stubby; short neck; and white cheeks. Only visits Central Park during the winter/non-breeding season.

Appendix C

C1 Satellite view of the Central Park Lake

Image 1.



C2 CAGO and Mallard species co-existing at the Site. Photos taken by the author.

Image 1. CAGO and Mallard are the two most common bird species to see at the Central Park Lake area.



Image 2. CAGO in front of the bio-filtration system at the Central Park Lake area.



Image 3. CAGO overpopulate the Central Park area for several reasons, including the abundance of lawn areas that offer plentiful, year-round foraging resources — with green grass always present and growing profusely due to its excellent health.



Image 4. Mallards are another nesting, invasive bird species in the Central Park Lake area. Its numbers at the Site sometimes total more than 100 individuals, with a recent high of 127 Mallard individuals counted on November 8, 2020. It's likely this large number is adding large amounts of feces to the lake's water, thereby impacting the performance of the bio-filtration system.



Appendix D—Fencing Options as a Barrier in Central Park’s Lake Area

Santa Clara Parks Canada Goose Project’s goal is to add 1,516 linear feet of fencing to the circumference of Central Park Lake.

Fencing Options:	Company Name	Contact Information	Cost and Comments
<p>1. Monofilament Fencing Style</p> <p>(Photo of this product)</p> <p>This option is the cheapest of those noted here. See the “Cost/Comments” column.</p>	<p>Deer Busters</p>		<p>Cost: 28.95 per 333’ on spool.</p> <p>20 spools will be needed for four rows on fence: $\\$28.95 \times 20 = \\$579 \times 4 = \\$2,316$.</p> <p>Other items associated with the monofilament spool are shown here: Scroll down the “Frequently bought together” section.</p> <p>Alternatively: Posts associated supplies will need to be purchased locally.</p>
<p>2. Critter fence Black Steel 2 Inch Square Grid 4 x 100</p>	<p>Critter Fence</p>	<p>John: 800-881-5327, ET john@critterfence.com</p>	<p>Cost: \$5,124 for four items, incl. fencing material. Free S&H.</p> <p>This purchase would supply 1800’ fence line at 4’ height, featuring 2” steel welded mesh with black vinyl coating, without ground overlap.</p>

Appendix E—Glossary

Addling

Goose egg addling is a wildlife management method of population control for the Moffitt's Canada Goose that overpopulate Central Park. The process of addling involves temporarily removing fertilized eggs from the nest, testing for embryo development, terminating embryo development by spraying oil on the eggs to prevent respiration of the egg, and placing the egg back in the nest. The result: eggs do not hatch because the respiration (i.e., "breathing") process stops because the oil coats an egg's pores.

Depredation Order (DO)

A depredation order (DO) is a permit applied for by a qualified, experienced Avian Biologist who obtains it from the US Fish and Wildlife Service on behalf of an organization that hosts an overpopulation of a species that requires reduction via non-lethal management. A DO provides regulatory authorization under the Migratory Bird Treaty Act (MBTA) to conduct specific migratory bird depredation management activities without the need for a qualified Avian Biologist to obtain an individual federal permit.

Friable

The condition of being friable, describes the tendency of a solid substance to break into smaller pieces under duress or contact, especially by rubbing. The opposite of friable is indurate.

Gander

A gander is an adult male goose.

Gosling

A gosling is a young goose.

ISA Certified Arborist

An International Society of Arboriculture (ISA) Certified Arborist® is a tree care professional who has attained a knowledge of tree identification, tree biology, diagnosis, maintenance practices, safety, and other subject and practice areas within the tree care profession.

Short Distance Dispersal

Birds disperse from their natal, breeding grounds after being born. In so doing, they disperse either short distances or long distances to find breeding grounds as they mature to breed. In some cases, such as Moffitt's Canada Goose in Central Park, newborn geese may disperse short distances to breed elsewhere in Santa Clara or elsewhere in the South Bay. Other bird species in the Santa Clara region (e.g., Bullock's Oriole) may disperse long distances as adults to breeding territories, in addition to completing annual migration patterns over long distances as far as South America before returning by spring to the San Francisco Bay Area.

Subspecies (or race)

In biological taxonomy, race is an informal rank in the taxonomic hierarchy for which various definitions exist. Sometimes it is used to denote a level below that of subspecies, while at other times it is used as a synonym for subspecies. Subspecies may be genetically distinct populations of individuals within the same species, or they may be defined in other ways, e.g., geographically, or physiologically.

Vegetation Management Plan

A Vegetation Management Plan (VMP) is a report-type document that addresses the on-going management requirements of native vegetation (trees, shrubs, and ground cover) within a proposed site such as Central Park, in the City of Santa Clara.

Appendix F – Depredation Order Data Form

Depredation Order Data Form for the Annual Submittal to the US Fish and Wildlife Service

Note: Central Park is registered as a legal, approved site for addling Moffitt's Canada eggs via the US Fish and Wildlife Service web site where addling results would be submitted at the following web site at the completion of each goose nesting season when addling occurs:

<https://epermits.fws.gov/eRCGR/>