

2024 Egg Addling Report

Regional Canada Goose Management Strategy

CRD | ENVIRONMENTAL PROTECTION



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1.0 Acknowledgements

The Capital Regional District (CRD) conducts its business within the traditional territories of over 20 First Nations, including Songhees, x̱w̱seps̱əm (Esquimalt), WJ̱O̱Ł̱Ł̱P (Tsartlip), BO̱ḴÉ̱C̱EN (Pauquachin), S̱ṮÁ̱UṮW̱ (Tsawout), W̱S̱IḴEM (Tseycum), MÁ̱LEX̱EL (Malahat), Sc̱'ianew (Beecher Bay), Ṯ'Sou-ke, Pacheedaht and Pune'laxutth' (Penelekt). All of whom have a long-standing relationship with the land and waters from time immemorial that continues to this day.

The CRD would like to recognize the continued hard work and dedication of the numerous groups who have contributed to Canada goose (CAGO) management in the capital region including Peninsula Area Agricultural Commission, Guardians of our Salish Estuaries, First Nations, South Island Farmer's Institute, Parks Canada, Department of National Defence, BC Parks, Victoria International Airport, Swan Lake Christmas Hill Nature Sanctuary, Galiano Island Conservancy and municipal staff from the region. The CRD would also like to acknowledge the contributions made from individuals such as Tom Michell, Bob Maxwell, Katie Underwood, Jody Wells and John Costello.



Figure 1. Photo of a Canada goose nest (photo by Samantha Hammond)



Figure 2. Photo of CRD technician marking Canada goose eggs (photo by Katie Lauer)

2.0 Introduction

Historically, Canada geese found on Vancouver Island were occasional migratory visitors over the autumn and winter months and were very rarely seen nesting. In the 1960's and 70's a CAGO introduction program was implemented by the Canadian Wildlife Service, BC Fish and Wildlife Branch and various other organizations to increase wildlife viewing and hunting opportunities in the capital region. The introduced geese were young birds from various subspecies of Canada geese who were unable to learn migrating behaviour patterns from their parents. Eventually these geese interbred, creating a hybrid population of non-migratory resident geese which are not native to the region. [1][2]

According to Christmas Bird Count data, the current Vancouver Island CAGO population ranges from 16,000-21,000 with an estimated 9,000-11,000 birds overwintering in the capital region [3]. The exponential growth of the regional CAGO population is degrading coastal ecosystems and waterways by over-grazing, trampling vegetation, soil erosion and the spread of invasive species. These areas include endangered Garry Oak ecosystems, near-shore islands in ecological reserves and estuaries that are critical habitats for young salmon [4] [5] [6]. Increased public health concerns have risen from public and private recreational sites including parks, sports fields, swimming beaches, golf courses and farmlands. These concerns are due to high densities of fecal matter, degradation and contamination of water sources, territorial goose conflicts and spread of disease [7]. Significant economic impacts have occurred with local farmers experiencing financial losses from CAGO damaging crops through grazing and soil erosion, increasing maintenance costs, and contaminating crops and water with their droppings. Poultry farms are also at risk of exposure of Highly Pathogenic Avian Influenza from CAGO [8]. These impacts have resulted in an increased pressure on local governments to take coordinated action.

In 2012, the CRD partnered with municipalities and other stakeholders to develop a Regional Canada Goose Management Strategy (RCGMS) to provide guidance for controlling the adverse impacts that the population of non-migratory, resident CAGO have in the capital region [2]. These management tools include population monitoring, preventing feeding, habitat modification, hazing, egg addling, hunting, harvesting and public outreach. Since its development, numerous actions have been undertaken with hazing strategies becoming the most popular. Unfortunately, without a coordinated approach, geese and their associated impacts have moved into new areas, expanding the nesting and overwintering populations.

In February 2023, the CRD Board approved the Canada Goose Management Service Establishment Bylaw No. 1, 2022 (Bylaw No. 4522) that aims to reduce the impact of the rapidly growing CAGO population in the capital region. This bylaw was adopted after receiving elector assent through a regional alternative approval process. The RCGMS includes:

- monitoring, mapping and reporting on CAGO populations and their impacts.
- coordinating and establishing collaborative partnerships with municipalities, First Nations, large landowners, Peninsula and Area Agricultural Commission, other government agencies and stewardship groups to implement the CRD's RCGMS.
- development and implementation of a communications strategy and public education program to support the management of CAGO populations.

- collaborating with other Vancouver Island regional districts, local governments, and First Nations to reduce CAGO populations through the Vancouver Island Canada Goose Management Working Group.

The RCGMS identifies egg addling as an effective approach to population reduction. This type of program is crucial for reducing the number of geese recruited into the population each year. Since 2018, the CRD has supported CAGO management actions in the capital region and has contracted an egg addling program with the Guardians of Our Salish Estuaries (GOOSE) since 2020. Additionally, other organizations in the region have supported CAGO management efforts with their own egg addling programs. For example, BC Parks entered a 10-year agreement in 2022 with GOOSE to addle eggs on the ecologically sensitive offshore islets of Oak Bay. The Department of National Defence (DND) has been implementing egg addling and other mitigation measures for over four years and Parks Canada has been involved in egg addling efforts since 2015. While these efforts have slowed the growth of the resident CAGO population, more work needs to be done to significantly reduce the recruitment of new geese.

The CRD initiated an in-house egg addling program in spring 2024 to build capacity and expand egg addling efforts into new areas. This initiative aims to build a comprehensive knowledge base of CAGO nesting behaviour, assist in addling efforts and promote coordination at a regional scale. Insights gained in the first year will inform subsequent efforts, fostering partnerships with landowners, managers, stewardship groups and First Nations. This report outlines the methods and results of the 2024 CRD egg addling field season and discusses limitations and recommendations for enhancing its effectiveness in subsequent years.

3.0 Methods

The egg addling program was initiated to reduce the number of geese recruited into the local population by decreasing egg viability and hatching success. The program ran from March to May 2024.

3.1 Partnership Building and Land Access

- **Working group:** A Regional Canada Goose Working Group (RCGWG) was established to coordinate efforts and share information between different stakeholders across the capital region.
- **Permit acquisition:** A regional permit from Environment & Climate Change Canada Canadian Wildlife Service (ECCC-CWS) was applied for in February and received on April 4, 2024. Additional park use permits were acquired for work in Sooke parks and View Royal parks on April 25 and April 30 respectively. Private property owners could join the permit by signing a land authorization form.
- **Program information dissemination:** Details about the CRD's new egg addling program were shared with the Peninsula and Area Agriculture Commission (PAAC), Esquimalt Lagoon Stewardship Initiative, Gorge Waterway Initiative, Capital Region Invasive Species Partnership and RCGWG during meetings and distributed through newsletters and mailing lists by CRD staff, PAAC, Ministry of Agriculture and the South Island Farming Institute. CRD staff engaged with municipal partners, First Nations, land managers and parks staff to determine potential CAGO nesting sites.
- **Landowner outreach:** A letter and pamphlet were created to inform property owners about the program and encourage participation. These materials were mailed to properties in known nesting hot spots.

- **Landowner authorization:** Participating landowners signed an authorization letter, adding their property to the CRD's permit and granting CRD technicians access to their land.
- **Ongoing engagement:** Continuous door-to-door canvassing and information sharing were conducted throughout the program in areas with confirmed CAGO nesting.
- **Partner relations:** Continue working with partners currently providing nest surveys and egg addling mitigation work in the capital region.
 - GOOSE continues to work with PAAC, the District of Central Saanich, BC Parks and various other stakeholders to provide egg addling services on farmlands, quarries and ecological reserve islets.
 - Parks Canada continues to conduct egg addling activities on park lands with a significant CAGO presence including Fort Rodd Hill and various sections of the Gulf Island National Park Reserve.
 - DND continues to provide mitigation measures on their lands and islets around the Esquimalt Harbour.
 - Swan Lake Christmas Hill Nature Sanctuary conducts its own egg addling program at the nature sanctuary in Saanich.
 - CRD staff offered nest identification and survey training to municipal parks staff through the RCGWG. Additional egg addling training was provided in the field to Saanich parks staff.

3.2 Nest Surveys and Egg Addling

- **Nest surveys:** Conducted on foot by CRD staff from April 4 to May 25 on properties the CRD had permission to access. Geese were gently removed from nests to allow technicians to addle eggs.
- **Sterilization:** When a nest with eggs was discovered, the egg addling protocol found below was followed:
 - a) Eggs underwent a float test (see Figure 3) and were not addled if beyond the development guidelines defined by the American Veterinary Medical Association [9].
 - b) If the eggs were at stage 1, they were below the incubation threshold for addling and were coated with vegetable oil to prevent gas exchange. If eggs were between development stages 2 and 5, they were addled by vigorously shaking the egg. If eggs were at stage 6, no sterilization techniques were administered (see Figure 3).
 - c) All eggs were then marked with a nest number and placed back into the nest to allow the goose to continue incubation, reducing the likelihood of re-nesting.
 - d) All nesting sites were re-visited in two-week intervals to sterilize any newly laid eggs and search for nests laid later in the breeding window.
- **Geographic Information System (GIS) tracking:** Addling information was entered into a GIS app called FULCRUM. Nest details, location information, visit date(s), and other notes or photos were recorded. Supplemental GIS data was compiled, and included areas where no nests were found, locations of missed or inaccessible nests, locations of recently hatched goslings and other relevant information.

- **Partner Egg Addling:** CAGO management partners (GOOSE, DND, Parks Canada and others) conducted nest surveys and egg addling using the same or similar methods and techniques as described above.

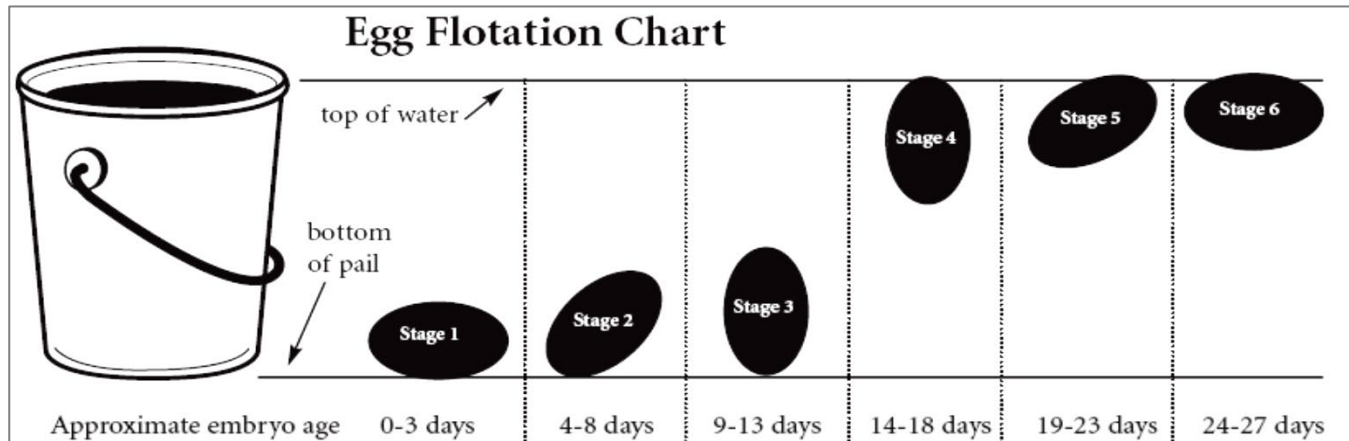


Figure 3. Float test infographic used to determine the age of a Canada goose egg. Image adapted from Iowa Department of Natural Resources [11]

3.3 Recruitment Surveys

- **Recruitment surveys:** Additional nest and recruitment surveys continued in late May and early June after the CAGO breeding window closed. Missed nests that were identified had GPS data recorded and areas with goslings highlighted potential nesting locations to access in the 2025 egg addling season. A brood is defined as a group of goslings with only its parents in attendance and can help us identify a missed nest. A gang brood is defined as multiple broods amalgamated into one, with more than two parents in attendance and can indicate multiple missed nests [10].
- **Online submissions:** Additional nest and gosling locations were extracted from a naturalist website called eBird where bird observations are mapped and submitted by the public. Submissions will continue to assist in the location of new nests in the following years.



Figure 4. Photo of Canada geese with their goslings spotted in downtown Victoria (photo by Lori Nickerson)

4.0 Results

4.1 Land Access Results

In March and April, CRD staff contacted 117 property owners with efforts largely focused on private farmlands and monitored the nesting status of multiple sites across the capital region (Table 1). Sites are defined as any area owned, leased, or managed by a particular group or person on either public or private lands. A total of 142 nests were discovered, with most nests (67%) located on private land and the remaining 33% located on public land (Figure 5). The number of nests found on each site varied with some sites having over 50 nests and others with just one. A total of 18 sites were discovered with active nesting and were addled by CRD staff. An additional 37 sites with historical breeding CAGO activity were surveyed with no nests being discovered.

CRD staff surveyed an additional 37 properties with historical CAGO activity where no nesting activity was found. Access was denied to three sites and authorization was delayed for another 17 properties. With contact now established, these properties can be more easily accessed for the 2025 CAGO nesting season. Attempts to contact the remaining 30 properties were made through mailouts, door-to-door visits, or by leaving informative letters; however, no replies were received.

Table 1. 2024 CRD program land access results in the capital region

Land Access Status	Site Count
Properties contacted	117
Surveyed by the CRD	55
Properties with active nesting	18
Properties with no nesting	37
Denied access	3
Potential sites added for 2025	29

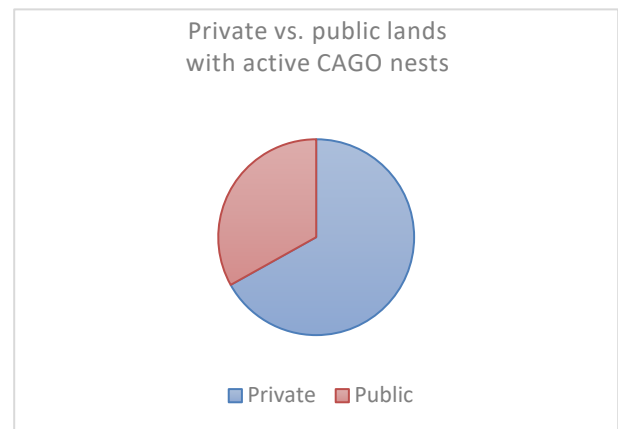


Figure 5. Pie chart comparing the difference between private and public lands where the CRD conducted egg addling activities.

4.2 Egg Addling Results

The 2024 CRD egg addling season began when the permit from ECCC-CWS was obtained. Surveys covered 55 sites and a total of 142 nests were discovered with 672 eggs that were addled or oiled by the CRD (Table 2). These nesting locations occurred at 18 different sites across seven municipalities and electoral districts. Additional data including missed nests, potential nests and inaccessible nests were included in the FULCRUM app (Table 3). Missed nests are defined as nests with eggs that failed the float test, were already hatching or had already hatched. Potential nests occurred when nesting activity was present, but the evidence was inconclusive and requires further verification next year. Combining missed and potential nests, the locations of an additional 31 nests could be more easily accessed next year. Inaccessible nests could not be safely accessed by CRD technicians and were largely located on steep cliff-sides.

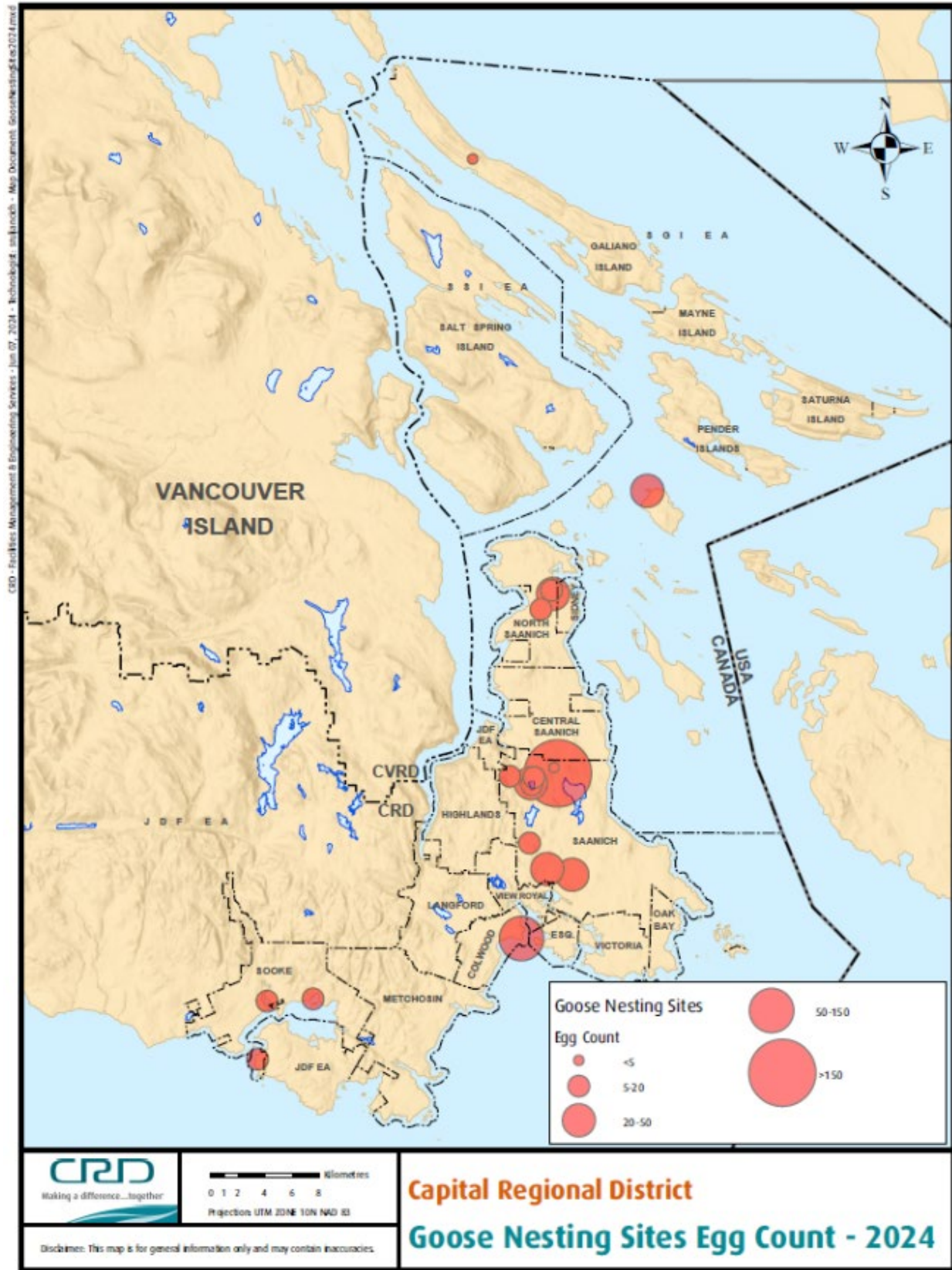


Figure 6. Map depicting the locations of Canada goose eggs treated by CRD technicians during the 2024 season

Table 2. Total number of CAGO nests, eggs and sites treated in each municipality by CRD technicians

Municipality	Sites	Total Nests	# of Treated Eggs
Gulf Islands	2	14	53
North Saanich	3	11	58
Saanich	9	79	396
Colwood	1	33	143
East Sooke	1	2	6
Sooke	2	3	16
Total	18	142	672

Table 3. Total number of known CAGO nests in the capital region

Nest Type	Count
Treated Nests	142
Missed Nests	19
Potential Nests	12
Inaccessible Nests	5
Total Known Nests	178

4.3 Coordinated Egg Addling Results

Addling efforts have been underway in the capital region for several years from partner organizations such as GOOSE, DND, Parks Canada and other groups. The coordinated efforts led to 422 nests and 2,041 eggs being addled in the capital region during the 2024 CAGO breeding season (Table 4). Addling efforts in the capital region have prevented a total of 5,232 Canada geese from entering the regional population since 2022. The CRD’s egg addling program has increased the number of treated eggs in the region by 20% in its first year.

Table 4. Total known CAGO nests and eggs treated in the capital region from 2022-2024

Partner	2022		2023		2024	
	Nests	Eggs	Nests	Eggs	Nests	Eggs
CRD	n/a	n/a	n/a	n/a	142	672
Guardians of our Salish Estuaries	236	1,162	207	1,019	201	1,037
Department of National Defense	53	175	54	206	38	148
Parks Canada	38	156	63	261	28	97
Other	21	108	19	104	13	87
Totals	348	1,601	343	1,590	422	2,041

4.4 Recruitment Surveys

In May, the CAGO nesting season naturally slowed down and as geese began to abandon their nests, goslings from untreated nests began to hatch. Identifying areas with goslings can help staff target new areas and uncover additional breeding hot spots for future egg addling programs.

CRD staff conducted 33 recruitment surveys which uncovered 273 young from approximately 42 broods. Two locations had large gang broods and the number of nests these goslings hatched from could not be determined. A total of 380 CAGO nest and gosling data submissions from eBird were compiled and investigated, which led to the addition of 90 locations to survey in 2025. Current gosling sightings were checked and confirmed with pictures or ground surveys and an additional 241 goslings were documented. Unfortunately, the number of broods and sizes were not included in the eBird submissions and therefore, an estimated number of missed nests could not be determined. A total of 514 goslings were spotted throughout the capital region. Confirmed sightings were compiled into a GIS layer in the FULCRUM app (Figure 7) that will prove invaluable to CRD staff in identifying new nesting sites in 2025. Salt Spring Island, Burnside Road West, Granville Avenue, Oldfield Road and Royal Roads University have all been identified as CAGO breeding hot spots requiring additional addling efforts in the 2025 season.



Figure 7. Map of CAGO recruitment surveys conducted in the capital region in May and June 2024. Yellow dots indicate confirmed young of the year locations.

5.0 Discussion

In its first year, the coordinated, region-wide CAGO egg addling program focused heavily on building relationships with landowners, identifying new nesting sites, and securing permission and access to both private and public lands. Over the past four years, the Guardians of Our Salish Estuaries were contracted by the CRD to champion the region's egg addling program in priority areas while also working with BC Parks, farmers, First Nations and others. Their areas of focus included farmlands, quarries and the ecologically sensitive islets off Oak Bay. After the regional CAGO service was initiated, the CRD gained additional capacity to create an in-house addling program, enabling the CRD to take on a coordination role and expand the program into new areas. The program change delayed the start of the program and surveys to discover new nesting sites began in early March. In April, a goose management technician was hired to assist with implementation. A regional permit was applied for by CRD staff to streamline the permitting process and alleviate the administrative burden from individual landowners. The permit received on April 4 from ECCC-CWS was delayed. This occurred for both the CRD and other egg addling partners, shortening the nest survey and egg addling window by up to two weeks.

Initially, CRD staff sought information from farmers, landowners and municipal parks staff through word of mouth, email newsletters and meetings. However, it was quickly discovered that many private landowners that had nesting geese on their property were not reachable through these methods. Additionally, tips from concerned citizens who spotted nesting geese on private properties often lacked sufficient contact information, making it challenging to follow-up. To address this issue and reach a broader audience, CRD staff developed a package containing a landowner letter and pamphlet detailing the egg addling program which could be mailed directly to known addresses. This package was also left at properties where CRD staff attempted contact while in the field. Of the 113 properties contacted within the boundaries of the CRD, three properties denied access and no response was received from 17 properties. These 20 properties contain known CAGO nests and new strategies for communication should be explored further next season. The combination of mailed packages and direct owner contact proved to be an effective communication strategy overall and should begin earlier and be expanded next year to cover new areas - specifically the Gulf Islands, North Saanich, Metchosin and Sooke.

The capital region encompasses a large land area and requires coordinated efforts from various partners to implement the egg addling program. The CAGO nesting window is only six to eight weeks, and eggs must be discovered within the first three weeks to be ethically sterilized using standard egg addling techniques. Organizations such as DND, Parks Canada, BC Parks and various others are actively engaging in egg addling activities on their own lands. This allows the CRD to focus on privately owned farmlands and other areas where the need for assistance is greatest. Key partners, such as farmers and municipal parks staff, are uniquely positioned to identify and report CAGO nesting locations while performing their regular duties. CRD staff found it most helpful when landowners or managers could guide them around their properties and highlight key areas where nesting geese have been observed. When municipal parks staff conducted nest surveys with CRD staff, it saved significant time because of their familiarity with the area. Building and expanding these relationships will be crucial for the growth of the egg addling program. CRD staff can facilitate this by engaging directly with the

farming community and other landowners and by increasing the number of participants in the regional CAGO working group. This group will continue to play a vital role in the information-sharing and relationship building platform necessary for this program.

A CAGO nesting hot spot is defined as an area with significant activity and represents approximately 75% of all nests located in 2024, with one site containing over 50 nests. These areas remain a top priority, and despite being concentrated, require a significant amount of time and attention to survey. Most nest surveys require a minimum of two visits, with hot spots often requiring three. In some cases, the terrain may be difficult and slow to navigate safely. However, even seemingly flat terrain (e.g., farmers fields) has enough vegetation mounds or dips to serve as hiding spots for nesting geese to tuck in down low, so that nests are not apparent until the technician is within metres of them. CAGO have a high site fidelity and will return to a successful nesting site in subsequent years. This allows us to obtain cumulative nesting records that can be accessed and expanded each year, reducing the time and effort required to discover nesting sites. More nesting locations can be further identified through participation from the public, scouting pre-nesting season mated CAGO pairs and following leads developed from supporting GIS data and recruitment surveys. A regional CAGO Communications Plan, which includes education on CAGO impacts and a media release asking for assistance from the public in reporting nests, was anticipated to roll out for the 2024 season; however, due to time and resource constraints, implementation of the Communications Plan was deferred to 2025. This plan will be an integral part of the regional egg addling program going forward in future seasons.

Overall, the first year of the coordinated regional egg addling program was successful. An additional 672 eggs from 142 nests were sterilized by CRD staff, bringing the regional total to 2,041 eggs. This represents an increase of 20% in just the first year. Data collected from the CRD's partners indicates that at least 5,232 CAGO were prevented from entering the resident population over the last three years. However, the total number of eggs addled in the capital region since management efforts began is unknown and likely much higher. As regional knowledge of nests is collected, the CRD can assist in developing a more strategic addling program that can be coordinated with interested stakeholders and partners.

6.0 Recommendations

The coordinated regional CAGO egg addling program had a successful first season. The program could be further improved to increase success in the following ways:

6.1 Increase Public Awareness and Participation in Reporting Nests

- Execute a public awareness campaign that includes media releases, social media content and mailouts. This strategy should aim to increase public awareness of CAGO impacts and the reason mitigation techniques are needed.
- A media release and social media campaign should be implemented ahead of nesting season (March) asking for the public's assistance in locating nests.

6.2 Promote Collaboration

- Effective addling in the capital region requires the promotion, development and assistance of addling efforts with interested First Nations, municipal staff, land managers and stewardship groups.
- Offer training by CRD staff to interested parties to get more participants involved. Focus on engaging with First Nations guardian programs.
- Continue to develop working relationships with other groups to understand how to best assist with current addling activities in the capital region.
- Work directly with the farming community and farming groups to obtain access to more properties with active CAGO nesting.
- Continue building relationships with landowners, First Nations and municipal staff.

6.3 Increase Egg Addling Budget

- Make the Goose Management Technician position an annual three-month term to include pre-season planning, scheduling and scouting for mated pairs to uncover new nesting areas.
- Increase the goose management budget to include extra hours for the Goose Management Coordinator to participate in the egg addling field season.

6.4 Diversify Addling Methods

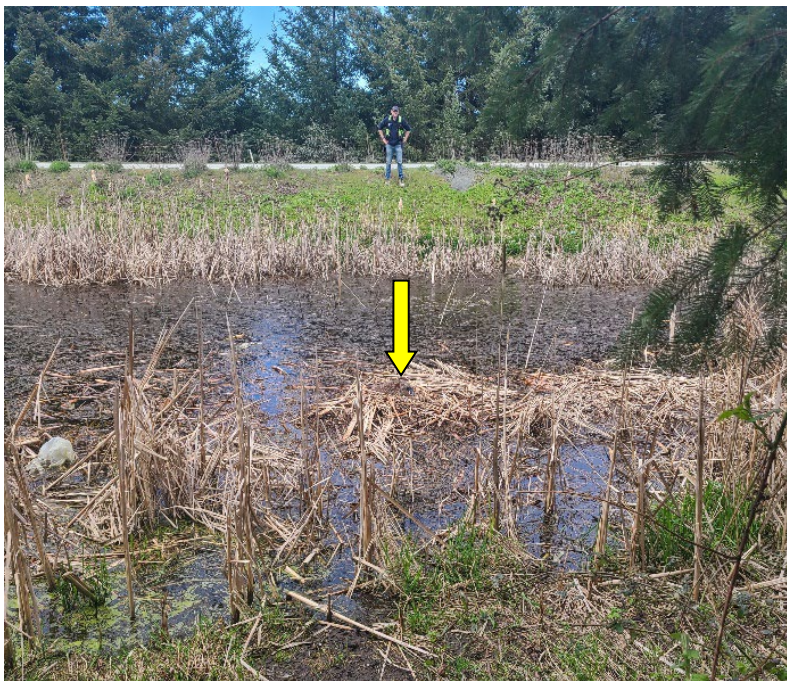
- Cooling and freezing eggs is another method of addling that is accepted by the American Veterinary Medical Association and used in more densely populated areas like Vancouver, BC. Treated eggs are thawed and swapped with fertile eggs to prevent re-nesting. This method allows the technician to quickly treat eggs with minimal interaction (less than a minute) and can be a suitable option for nests in high-profile areas. This can help alleviate concerns some municipalities have with the sensitivities and concerns of a potentially viewing public.
- Obtain a kayak or row boat and chest waders to access more nests.

6.5 Streamline Processes

- Apply for a regional egg addling permit from ECCC-CWS in February that private landowners can join with a land authorization form.
- Reduce the bureaucracy and paperwork burden for municipalities, farmers and other land owners to make participation in the egg addling program easier by removing park use permit requirements for nest surveys and obtaining the regional egg addling permit.

7.0 Conclusion

The first year of the coordinated egg addling program has shown promising progress and early signs of success. Addling is an essential tool required to limit recruitment and reduce population growth effectively. While current efforts are slowing the growth of CAGO populations and leading to stabilization, they are unlikely to achieve significant reductions on their own. To achieve meaningful results, it is crucial to allocate more resources, build stronger partnerships, implement additional mitigation measures and expand the program further.



*Figure 8. Photo of a hard-to-reach goose nest at Hartland Landfill
(photo by Samantha Hammond)*

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