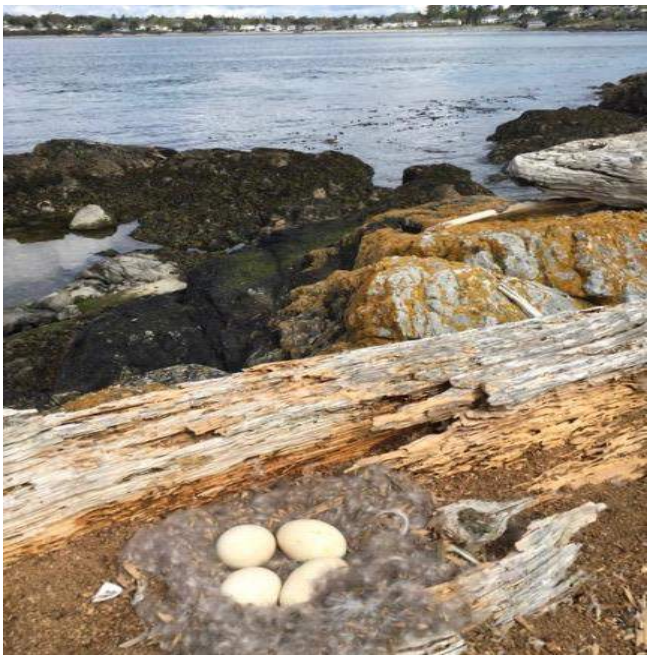
APPENDIX A



CANADA GOOSE MITIGATION AND POPULATION MONITORING

Guardians of Mid-Island Estuaries Society

JANUARY 27, 2022

SUBMITTED TO GLENN HARRIS, SENIOR MANAGER, ENVIRONMENTAL PROTECTION
Capital Regional District

Table of Contents

List of Tables and Figures

Photo Credits: Garreth Ashley and Graeme Fowler

Introduction

In response to requests for help from landowners and some municipalities, the Guardians of Mid-Island Estuaries Society (GoMIES) has recently initiated Canada Goose (CAGO) population mitigation within the Capital Regional District (CRD). Surveys of breeding, summer moult and winter populations have been conducted since 2017. On the ground mitigation work was begun in cooperation with the Tsawout First Nation in the form of harvests of geese in 2018 and 2019. In spring of 2020 and 2021, extensive egg addling services were provided from Sooke to the Saanich Peninsula. In 2021 alone, 241 active nests containing 1,298 eggs were treated by our addling crews in CRD municipalities. Approximately half these nests were located in previously undocumented CAGO breeding "hotspots" on local agricultural properties.

GoMIES programs have yielded valuable insight into how CAGO population mitigation measures can help reduce populations of CAGO in the CRD and elsewhere. These programs have already produced quantifiable decreases in moulting and wintering CAGO populations, which are documented in this report.

Historical Abundance of Canada Geese (*Branta canadensis*) within the CRD

During the first half of the 20th century, the Canada Goose was mainly a migrant and summer visitant in most of British Columbia. One subspecies, the Vancouver Canada Goose (*Branta canadensis fulva*) was then known to breed in small numbers on northern Vancouver Island, but breeding was absent on southern Vancouver Island (Campbell et al. 1990). Beginning in the 1950s and then more intensively through the 1970s and early 1980s, Canada Geese were captured elsewhere and released in south coastal BC, including southern Vancouver Island, by government agencies attempting to establish populations of breeding geese.

On southern Vancouver Island, there is some evidence that private game farms may have released geese on southern Vancouver Island in the 1930s and 1940s and a small population was established at Quamichan Lake in the 1940s (Dawe and Stewart 2010). The first breeding record in the CRD was in 1954 from a few nesting geese at Elk Lake. Canada Geese remained very scarce in the CRD through the early 1960s (Dawe and Stewart 2010). In 1963 a number of winter waterfowl surveys found zero Canada Geese overwintering in the CRD (Hancock 1963). Populations began expanding by the late 1960s from breeding areas in Victoria, Duncan and Nanaimo. By the 1980s Canada Geese were already becoming nuisance birds at some locations (Campbell et al. 1990). By the 1990s, Canada Geese were nesting in most of southeastern Vancouver Island.

Only two species of waterbirds have shown significant increases within the Salish Sea area of BC since 1999, one of which is the Canada Goose. Population growth rates have been remarkable on southern Vancouver Island. Dawe and Stewart (2010) report a 16% annual growth rate (or a doubling of numbers every 4.3 years) in wintering populations from 1977 to 1997, then a levelling off from 1998 to 2010, with an estimated winter population of 15,000 geese. GoMIES has also estimated the wintering population to be from 12,000-15,000 in recent years. That estimate is similar to the 2010 estimate (Dawe and Stewart 2010) and is thought to have been maintained by the addling and harvest efforts of GoMIES

from 2010 to 2021. Overwintering goose populations there are estimated to have increased at an annual rate of 4.9% from 1999-2019 (Ethier et al. 2020). That rate translates to a doubling of the population every 14.3 years. Whether or not that current estimated rate of increase is true for the CRD, it supports the widely held view that Canada Goose populations on southern Vancouver Island have increased substantially in the past. The increasing trend is well shown by winter counts done on the annual Christmas Bird Count (Figure 1).

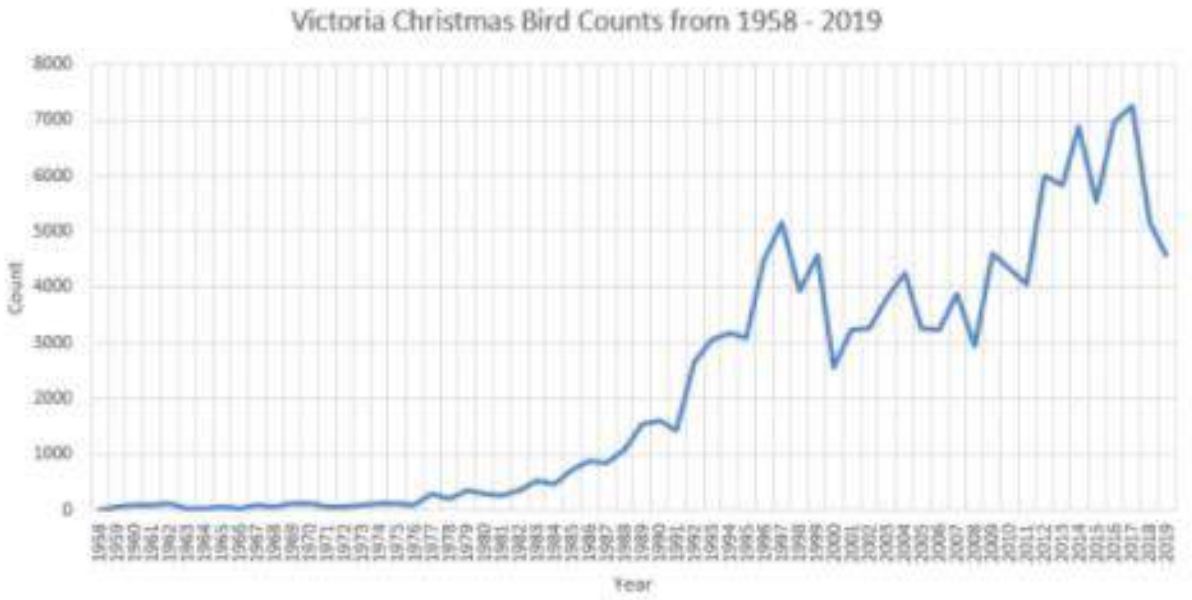


Figure 1: Historical CRD CAGO data, provided by Ann Nightingale, Rocky Point Bird Observatory.

A large percentage of the Canada Goose population on Vancouver Island remains year-round, although considerable movements of geese within the region occur. GoMIES (2015) documented the phenomena of moult migration whereby some geese that breed elsewhere on the island and the northwest USA fly to the east coast of Vancouver Island to moult in late June and early July. From their study sites at the Englishman, Little Qualicum and Campbell rivers, other seasonal movements within the region were documented. Pearce and Demers (2019) documented similar movements with birds that were captured and banded in summer in Nanaimo.

In summary Canada Goose breeding, moulting and wintering populations in the CRD have increased from zero in the 1940s to hundreds of nesting pairs and several thousands of moult and wintering geese. In 2012 the CRD commissioned a Regional Canada Goose Management Strategy which provided guiding principles for managing Canada Goose populations to reduce impacts on farmlands, parks and recreational areas. Suggested initiatives in that document remain to be implemented by the CRD.

Summer CAGO Population Surveys CRD (2017-2021)

On the 7th of July 2017, an aerial moult count survey of Canada Geese (*Branta canadensis*) was conducted along the south-eastern Vancouver Island coast and included the larger nearby lakes. During the survey 4,002 CAGO were observed from Sooke to Sidney. The highest concentrations were found in the Sooke Basin, Esquimalt Lagoon and the eastern coastline of the Saanich Peninsula (Sidney, south to Tsawout FN Reserve).

A Jet Ranger Helicopter (West Coast Helicopters) was used to perform the aerial survey. Altitude for observation was held at 100ft (30.48m) when conditions allowed and 300-500ft (90-150m) over urbanized areas. Restricted urban areas were excluded by our pilot, therefore sections such as the Gorge were bypassed. GoMIES estimates an additional 500 CAGO may have been present in these zones.

A drone survey of the CRD (Sooke to Sidney) was carried out by contractors hired by GoMIES during June of 2019. Videos taken by the drone showed 3,498 CAGO present. It is estimated that 35-40% of these were young of the year. This observation highlighted the need for an intensified addling effort within the CRD.

In late June 2020 a moult count was carried out by GoMIES staff via kayak, over three days, from Sooke, moving east to the Victoria area, and north to the Saanich Peninsula. 2,774 CAGO were counted during the survey.

In July 2021 GoMIES conducted a Canada Goose moult survey within the CRD. The purpose of this survey was to identify local “hotspots” of non-migratory populations within the CRD during the annual moulting season, which lasts approximately from mid-June to mid-July. The surveyed area included Sooke Basin and progressed east, then north-east up into the Saanich Peninsula. The count was conducted over a three-day period (see Figure 2, page 7 and table 6 in the appendix I).

GoMIES’ surveyors accessed more remote areas, that were not accessible by public road, via sea kayaks. This method was primarily deployed to survey the Sooke Basin. In areas that had public road access to shorelines, optical equipment was utilized in CAGO observation.

Photo 1: Canada Geese congregate on the shores of Sooke Basin, 2021.

Photo 2: Disrupting traffic in Victoria, 2021.

Photo 3: Graeme Fowler, GoMIES' wildlife mitigation specialist, scans for CAGO in Sooke Basin.

Photo 4: A small gaggle of Canada Geese gather on a sandy shore, Sooke Basin.

Photo 5: Garreth Ashley is approached by extremely habituated Canada Geese, Esquimalt Lagoon.

Table 1: Guardians of Mid-Island Estuaries Society, Canada Goose moult count, Capital Regional District, CAGO distribution by municipality. July 2021.

Municipality	#CAGO	Notes
Sooke	540	Primarily observed within the basin and estuary
Metchosin	27	
Colwood	615	Large groups sheltering on northern shore of the lagoon
Langford		
View Royal	25	
Esquimalt		
Victoria	127	
Oak Bay	369	These individuals likely using ecological reserves as nesting grounds.
Saanich	29	
Central Saanich	46	
Sidney	71	
North Saanich	53	
Total	**1,902**	

Survey results showed the largest concentrations of moulting CAGO located in the Esquimalt Lagoon and the Sooke Basin. The moulting group of 104 CAGO found on McNeil Bay would be those individuals who use the Trial Islands as their nesting grounds. Whereas Willows Park and Oak Bay Marina groups would most likely be nesting on Great Chain Island. The 49 individuals recorded on Victoria Golf Course would also be utilizing Great Chain Island as a breeding territory.

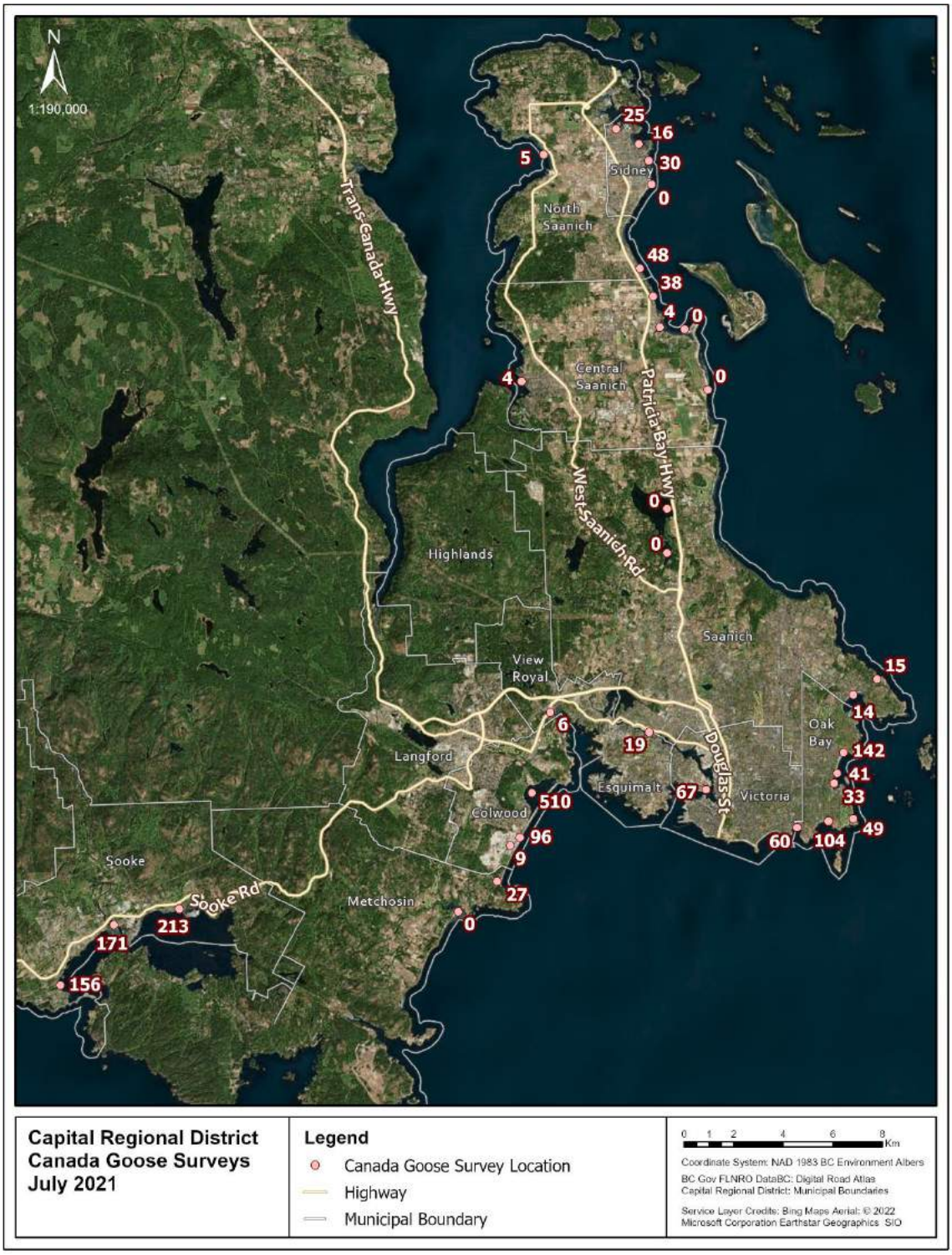


Figure 2: 2021 CRD CAGO moult count results.

Winter Counts

On 9 February 2019 an aerial survey via helicopter of the CRD was conducted by GoMIES; 2,977 individual CAGO were tallied. On 8 February 2020, 3,431 CAGO were observed by surveyors from the Rocky Point Bird Observatory. As is the case with GoMIES' CRD CAGO surveys, the counts were conducted from Sooke to Sidney (Nightingale, Ann. 2020). Before mitigation was initiated by GoMIES in 2018, we see that CAGO winter populations peaked at approximately 7,000 individuals around 2017. This is illustrated by Anne Nightingale's historical CBC graph below (Figure 2).The decline in winter numbers can possibly be attributed to harvests done in cooperation with Tsawout First Nations (2018-2019) and an increased addling effort within the CRD by GoMIES.

Table 2: Results of 2019 GoMIES aerial CAGO survey.

Location	CAGO	Comments
North Saanich	1897	Feb. 10, ground count, snowing
Central Saanich	473	Feb. 10, ground count, snowing
Esquimalt Lagoon Royal Roads	127	Feb. 19th, aerial count
Sooke	101	Feb. 19th, aerial count
Victoria Golf Club	245	Feb. 19th, aerial count
Victoria Gorge waterway	66	Feb 21, ground count
Victoria Islands (James, Piers, Coal, unnamed)	68	Feb 19th, aerial count
CRD Total	**2,977**	

Effects of Resident Canada Goose Herbivory on Local Agricultural Production

Within the CRD, the overabundant resident Canada Goose population has significant impacts on thousands of acres of vegetables, berries, grain, grass and corn crops. Impacts to the local farm crops include cash crop consumption, fouling, and plant damage and removal. Farmers have been complaining for many years and their complaints and estimated financial losses are well documented though the Peninsula & Area Agricultural Commission as well as numerous media releases. Many of the on-farm mitigation tools and strategies are unpalatable to the general public. The use of propane cannons, lasers, pyrotechnics, and animal distress calls are a cause of concern for neighbouring residents. Provincial and Federal wildlife mitigation permits have been utilized by individual farms where farm characteristics are deemed appropriate, and the lethal activities can be carried out in a safe manner. For many of the farms within the CRD these permits are not appropriate due to farm size and proximity of other residences.

Nest searches and egg addling through an organized addling program provides an immediate benefit to farmers, and others, when recruitment of young birds can be dramatically reduced. Addling programs are a widely acceptable form of population control, approved by the BCSPCA. Egg addling by trained personnel can be done quietly, with limited disturbance to the public even in densely populated areas where other mitigation measures such as hunting are not allowed.

Photo 6: A Central Saanich farm field being used as a CAGO breeding ground.

Guardians of Mid-Island Estuaries Society Egg Addling in the CRD

During the past two years, GoMIES has addled Canada Goose eggs and conducted breeding population surveys in the CRD. Results from 2020 and 2021 were astounding including hundreds of nests at many locations within the CRD (Table 3, 4). Canada Geese have expanded from traditional nesting habitats in wetlands and farmlands to offshore islets and quarries. There were 126 (2020) and 123 (2021) goose nests found on offshore islets in Oak Bay; many of which are Ecological Reserves (GoMIES 2021). No geese nested on these islands in the early 1980s. The high number of geese nesting on these islands are threatening the ecological integrity of the rare Garry Oak ecosystems there as native vegetation and rare plants are being consumed or destroyed and replaced by weedy plant species.

171 Canada Goose nests were found in quarries and farmlands in the CRD in 2021. One farm near Elk Lake held 45 nests alone (GoMIES 2021). Data from the Royal Bay development in Colwood showed 88 Canada Goose nests in 2020; we believe no addling occurred on these private lands in 2021.

Conclusions

Canada Geese continue to breed, summer and overwinter in large numbers in the CRD. These populations foul beaches, parks, playgrounds and school yards, cause extensive damage to estuary and island ecosystems, and reduce productivity of farmlands. Management actions taken by GoMIES since 2018 appear to have stabilized or reduced Canada Goose numbers in the CRD. Although some progress has been made with management of goose populations, mitigation measures will need to be continued in order to maintain populations at current levels or to reduce them.

Table 3: Total number of nests located, and eggs addled at each location by the GoMIES Field Crew in the Capital Regional District of Vancouver Island, Spring 2020.

Location	Land Management	Nests located	Total eggs addled
Farmland	Private	13	60
Jemmy Jones Island	Oak Bay Ecological Reserve	19	92
Flower Island	Oak Bay Ecological Reserve	7	25
Great Chain Island	Oak Bay Ecological Reserve	46	240
Mary Tod Island	Oak Bay Ecological Reserve	1	8
Staines Island	Oak Bay Ecological Reserve	3	13
Uplands Islets	Oak Bay Ecological Reserve	2	8
Trial Islands	*Oak Bay Ecological Reserve*	*46*	*280*
Griffin Island	*Oak Bay Ecological Reserve*	*1*	*4*
Alpha Island	*Oak Bay Ecological Reserve*	*1*	*1*
Quarries	Private	8	32
	Total	**147**	**763**

Table 4: results from addling season 2021, CRD islands.

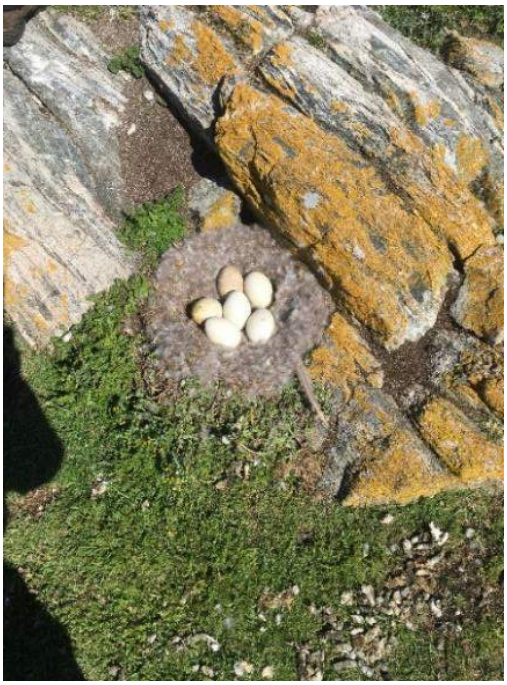
Location	2021 nests	2021 eggs
Jemmy Jones	13	66
Flower Island	8	42
Great Chain	37	216
Mary Tod	0	0
Staines Island	3	20
Uplands Islets	3	15
Lesser Trail	38	222
Greater Trial	19	96
Alpha	1	6
Oak Institute	1	5
Total	**123**	**688**

Table 5: 2021 Farm and Quarry addling results from the CRD.

General Location (private lands)	2021 Nests	2021 eggs
Saanich	7	35
Saanich	13	64
Central Saanich	2	9
Central Saanich	14	81
Central Saanich	45	239
Sooke	4	25
Sooke	7	43
Sooke	3	15
Sooke	1	4
Metchosin	1	6
Central Saanich	21	89
Total	**118**	**610**

Photo 7: GoMIES addling crew is escorted out to Great Chain Island by Matt Fairbarns, spring 2021.

Photo 8: The rare Bear's-foot Sanicle (*Sanicula arctopoides*) on Greater Trial Island.



Photos 9 & 10: Invasive Canada Goose nests on the ecologically sensitive Greater Trial Island.

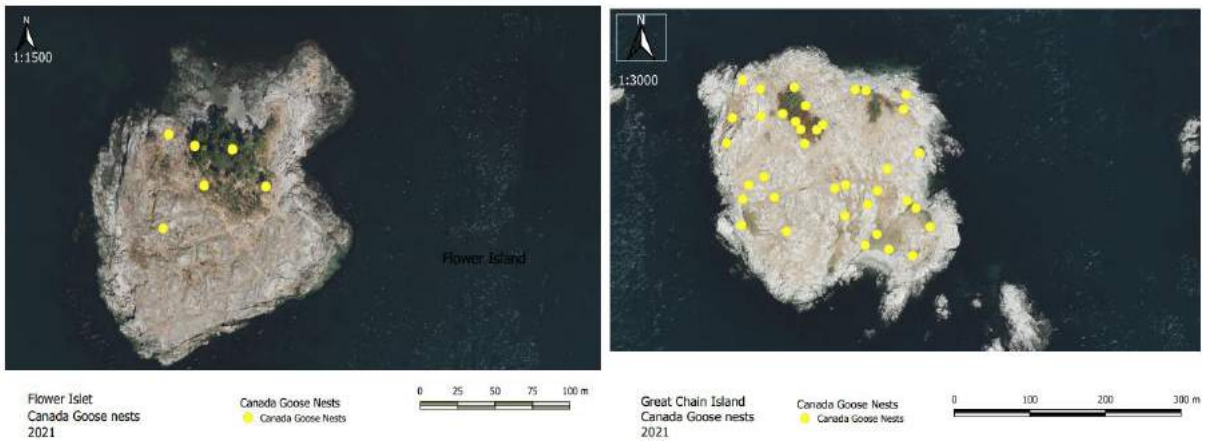


Figure 3 & 4: CAGO Nest locations on Flower Island and Great Chain Island 2021.

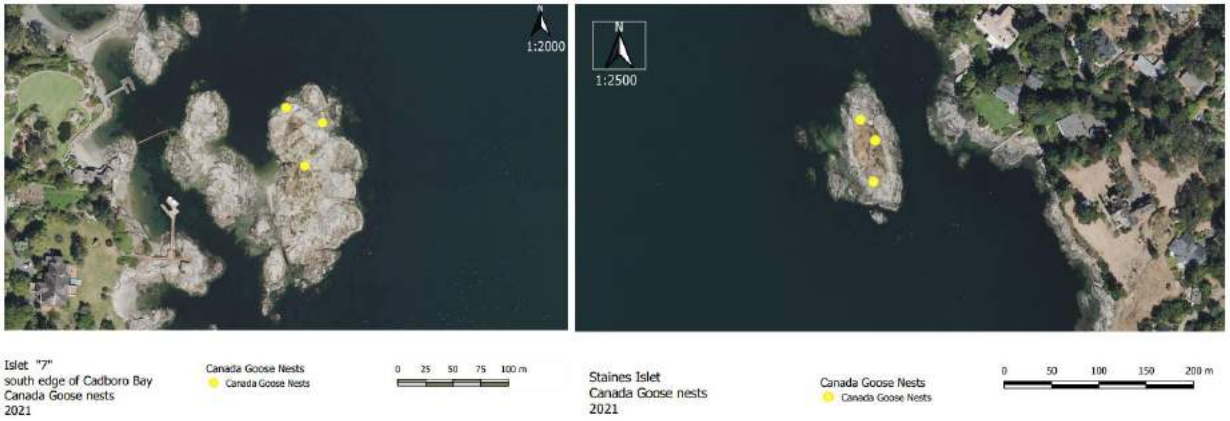


Figure 5 & 6: CAGO nest locations for "Islet 7" and Staines Islet, 2021

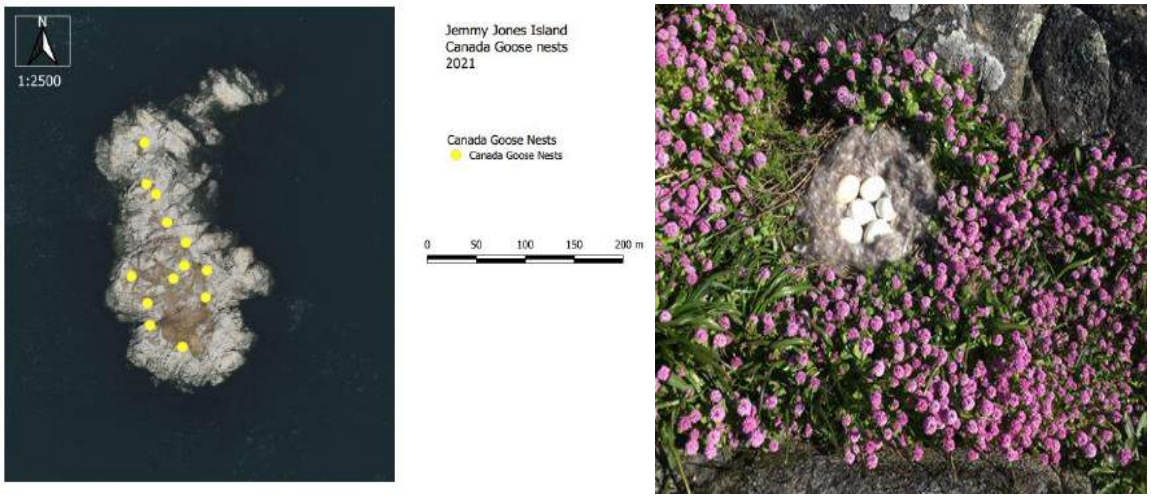


Figure 7: Jemmy Jones Island, CAGO nesting locations. Right: typical nest on Jemmy Jones Is.

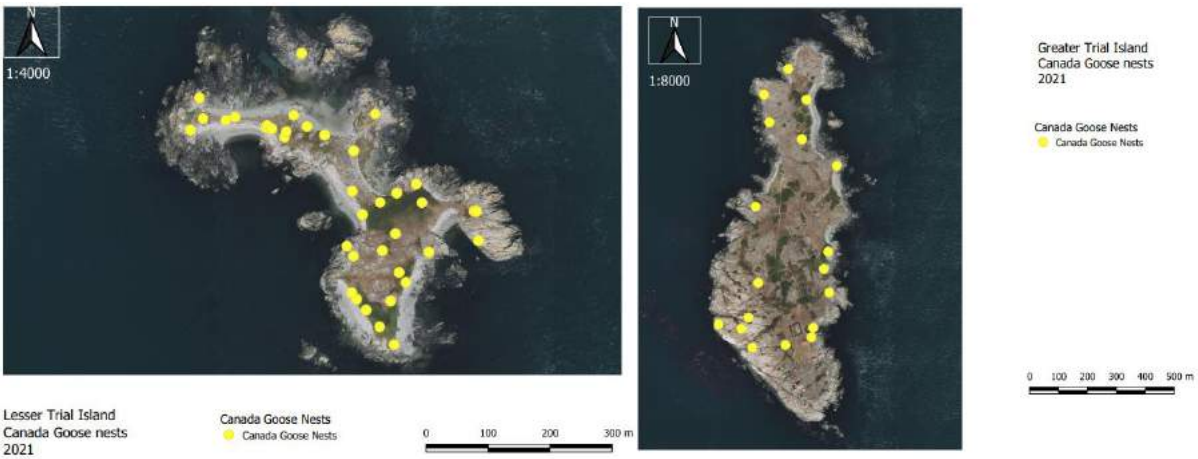
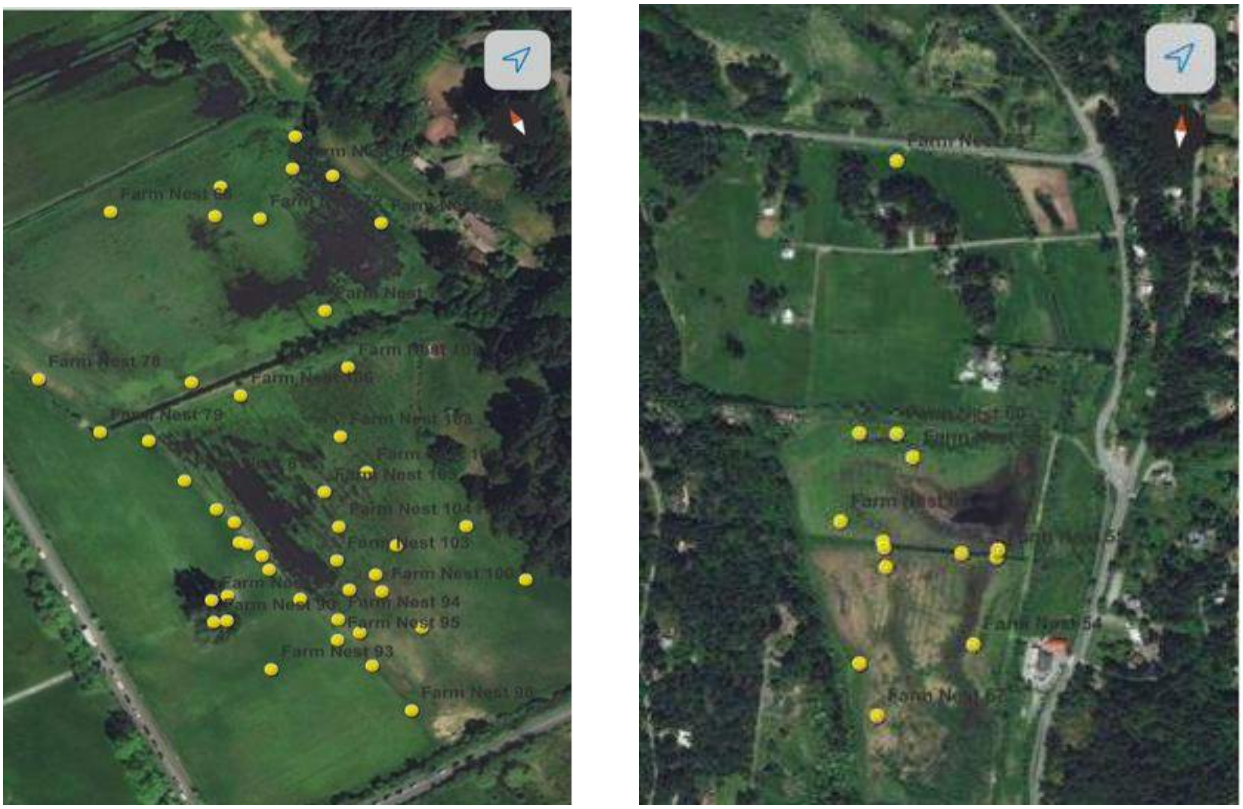


Figure 8 & 9: CAGO nest locations on Lesser and Greater Trial Island, 2021.



Figures 10 & 11: Extremely dense nesting populations discovered in farmlands in 2021, Saanich Peninsula. Specific address not given for land owner privacy.

Figure 12: Both agricultural properties and quarries are used as nesting habitat by CAGO in the CRD.

Photos 11 & 12: Left: Approximately 450 CAGO swim along the east coast of the Saanich Peninsula. Right: Hatched-out CAGO nest in a farm field, Central Saanich.

Photo 13: Hundreds of Canada Geese loafing on a Saanich Peninsula agricultural field.

Photos 14 & 15: CAGO at Royal Roads and Esquimalt Lagoon

Photos 16 & 17: Large numbers of CAGO disrupting play at Victoria Golf Club.


Photo 18 & 19: Even active quarries and construction sites are being utilized as nesting habitat by invaisive CAGO in the CRD.


Photos 20 & 21: small ponds on farmlands within the CRD are favoured nesting sites.


Photos 22 & 23: Abandoned farm property near Elk Lake with high density of CAGO nesting. Forty-six nests were located and addled on this single property. Right: red dots represent adult CAGO nesting and grazing in field.

Citations:

Campbell, R.W., N.K. Dawe, I. McTaggart-Cowan, J.M Cooper, G.W. Kaiser and M.C.E McNall. 1990. The, Volume birds of British Columbia 1. Royal British Columbia Museum, Victoria, BC.

Dawe, N.K. and A.C. Stewart. 2010. The Canada Goose (*Branta canadensis*) on Vancouver Island, British Columbia. BC Birds 20:24-40.

Ethier, D., P. Davidson, G.H. Sorenson, K.L. Barry, K. Devitt, C.B. Jardine, D. Lepage and D.W. Bradley. 2020. Twenty years of coastal waterbird trends suggest regional patterns of environmental pressure in British Columbia, Canada. Avian Conservation and Ecology 15(2):20.

GoMIES (Guardians of Mid-Island Estuaries Society). 2015. Canada Goose (*Branta canadensis*) Management Strategy for Mount Arrowsmith Biosphere Region: Towards the Restoration of Goose-Damaged Estuaries. Prepared for the Guardians of Mid- Island Estuary Society www.estuaryguardians.org.

GoMIES (Guardians of Mid-Island Estuaries Society). 2017. Moult count surveys of Canada Geese (*Branta canadensis*), July 2017. www.estuaryguardians.org.

GoMIES (Guardians of Mid-Island Estuaries Society). 2021. 2020/2021 Canada goose addling report. 24 pp.

Hancock, D. 1963. The abundance of wintering waterfowl in the Victoria area, BC. Victoria College, Victoria, BC.

Nightingale, Ann. 2020. Goose Survey from Sooke to Sidney February 8, 2020, Coordinated by Ann Nightingale, Rocky Point Bird Observatory.

Appendix I

Please visit:

[Aerial Moult Count Survey of Canada Geese (parksville.ca)]

[www.estuaryguardians.org]

Table 6: Location and distribution of CRD CAGO moulting population, July 2021.

Location of Observation	#CAGO	Latitude°	Longitude°	Notes
Sooke Basin West	156	48.36312	°-123.72606°	Accessed via kayak, 6 YOY sighted
Sooke Basin East	213	48.38863°	-123.66302°	Kayaked, 2 YOY sighted
Sooke River Estuary	171	48.38439°	-123.69970°	
Witty's Lagoon	0	48.38498°	-123.51226°	
Albert Lagoon	27	48.39545°	-123.49049°	
Royal Bay Construction	9	48.40827°	-123.48274°	
Royal Beach Park	96	48.41113°	-123.47727°	
Esquimalt Lagoon	510	48.42718°	-123.47003°	
Six Mile Bridge	6	48.45616°	-123.45839°	
The Gorge	19	48.44767°	-123.40511°	
City of Victoria (Delta Waterfront)	67	48.42605°	-123.37521°	
Gonzales Bay	60	48.41105°	-123.32650°	
McNeil Bay	104	48.41294°	-123.30939°	
Victoria Golf Course	49	48.41341°	-123.29590°	
Oak Bay Marina	33	48.42654°	-123.30547°	
Oak Bay	41			
Willows Park Beach	142	48.43759°	-123.29970°	
Cadboro Bay	14	48.45850°	-123.29319°	2 YOY
Telegraph Beach	15	48.46383°	-123.27980°	
Island View Beach	0			
Tsawout Spit	0	48.592553°	-123.375336°	
Tsawout Estuary	4	48.594169°	-123.391983°	
Cascade Ave.	38	48.605737°	-123.394746°	
Amity Drive	48	48.615531°	-123.400751°	
Sidney Waterfront/Pier	0			
Sidney Marina	30			
3rd St, Sydney	16	48.660159°	-123.397552°	
Resthaven	25	48.666521°	-123.410354°	
Patricia Bay	5	48.65862°	-123.45129°	
Brentwood Bay	4	48.57668°	-123.46768°	
Beaver Lake	0			
Elk Lake	0			
Total	1902			

Appendix II:

History of the Guardians of Mid-Island Estuaries Society's CAGO Mitigation

The Guardians of Mid-Island Estuaries Society (GoMIES) started addling programs on Vancouver Island in the Cowichan Valley in 1999 in response to farmer complaints of excessive Canada Goose (CAGO) damage to local crops. These efforts expanded to the Parksville-Qualicum Beach area in 2002 when the City of Parksville and conservation organizations began to fund egg addling at three local estuaries. Their concerns were two-fold as rising breeding and summer moult CAGO populations were discovered to be destroying sedge marsh habitat critical to juvenile salmon and wildlife at an alarming rate, and tourists' complaints to local governments were constant. In 2010, GoMIES formed as a registered Society with a mandate to protect estuaries and bring more awareness to the many negative effects of locally over-abundant CAGO through science-based actions. Our 2015 "Canada Goose Management Strategy for the Mount Arrowsmith Biosphere Region" was a catalyst towards more active management throughout the Regional District of Nanaimo and remains as the most comprehensive document regarding Canada Goose management in North America. http://www.parksville.ca/cms.asp?wpID=507