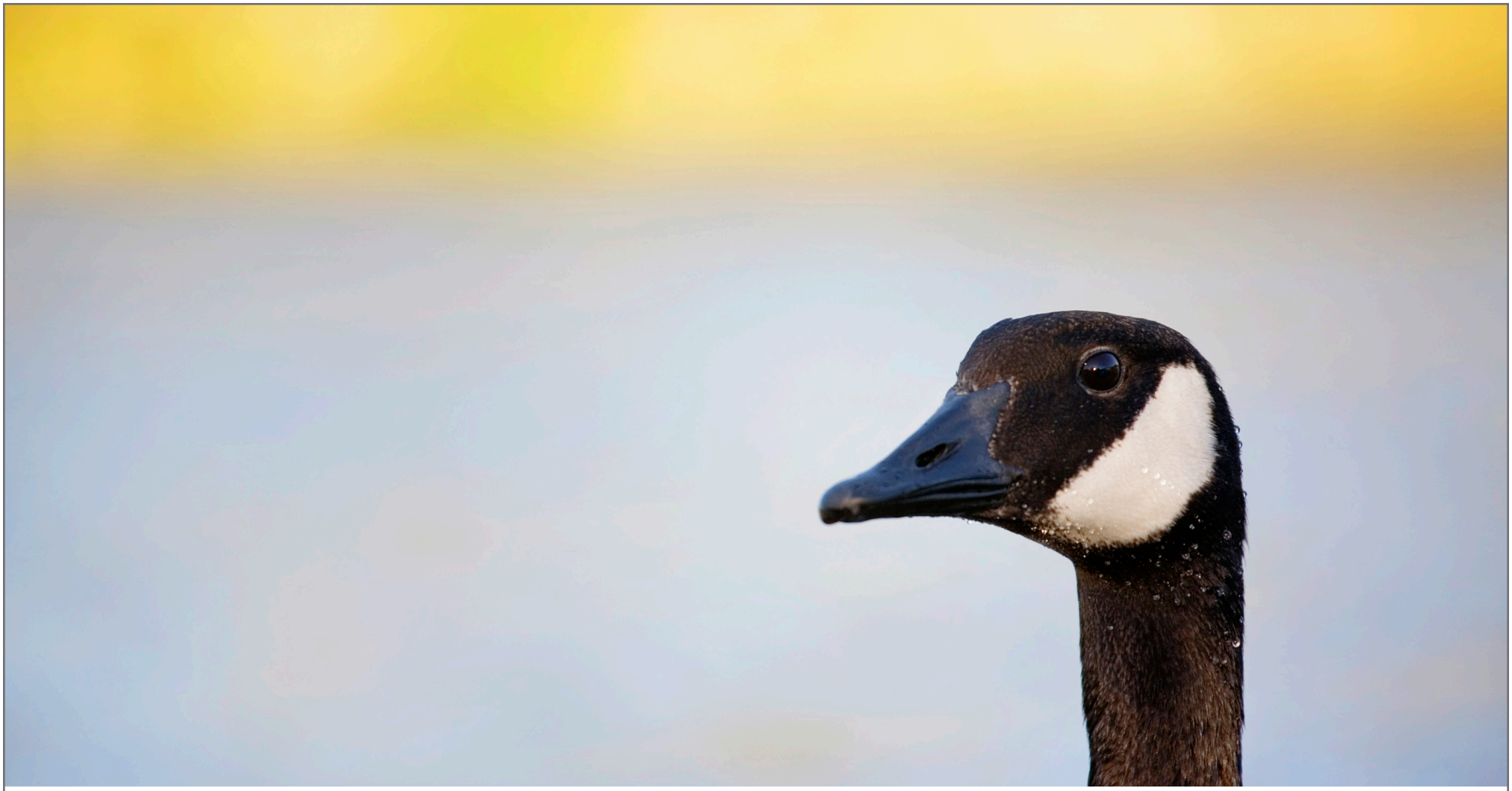

Regional Canada Goose Management Strategy

August 28, 2012

regional canada goose
management strategy

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Executive Summary

In 2010, the Capital Regional District (CRD) partnered with municipalities and other stakeholders to develop a Regional Canada Goose Management Strategy to provide guidance for controlling adverse impacts of the population of non-migratory resident Canada geese in the capital region. During 2011-12, extensive data were collected on the historical presence of geese in the capital region, goose population abundance and distribution, seasonal habitat use by geese, and agricultural impacts.

The synthesis of data and collaboration with a multi-stakeholder working committee has led to the development of this document, REGIONAL CANADA GOOSE MANAGEMENT STRATEGY, which describes a long-term multi-faceted approach to management of non-migratory resident Canada geese.

1 Introduction

1.1 DOCUMENT INTENT

The intent of this document is to provide regional and strategic guidance for the management of non-migratory resident Canada geese in the capital region. Where Canada geese and the capital region are discussed in this document, management of geese refers only to non-migratory resident Canada geese. The information provided in this document is based on the best knowledge available at the time of development. As part of the management process, recommendations in this document will be reviewed through an adaptive management process as new information becomes available.

1.2 DEVELOPMENT OF A REGIONAL CANADA GOOSE MANAGEMENT STRATEGY

In 2010, the Capital Regional District (CRD) partnered with municipalities and other stakeholders in the region to develop a Regional Canada Goose Management Strategy (RCGMS) to provide guidance for controlling the population of non-migratory resident Canada geese in the capital region. The CRD Parks Operations Services acted as the overall project administrator with a steering committee made up of members from the following:

- BC Ministry of Agriculture
- BC Ministry of Environment
- Canadian Wildlife Service (CWS) of Environment Canada
- District of Central Saanich
- District of Metchosin
- District of North Saanich
- Fruit Growers Association
- Peninsula Agriculture Commission
- Town of Sidney
- First Nations
- Victoria Airport Authority

The committee identified a guiding statement and key objectives to be addressed in the goose management strategy:

Guiding Statement:

Guiding a regional approach for the reduction and mitigation of negative impacts resulting from non-migratory resident Canada geese within the capital region.

Objectives:

- Develop a knowledge base for the CRD and its member municipalities, federal and provincial agencies, First Nations, Vancouver Island farmers and non-governmental environmental organizations on non-migratory resident Canada goose population management methods;
- Reduce damage to agricultural crops by non-migratory resident Canada geese that results in economic losses to farmers;
- Reduce non-migratory resident Canada goose impacts on parks and recreational areas;
- Reduce non-migratory resident Canada goose impacts on natural habitats; and
- Reduce hazards to aviation at the Victoria International Airport.

In 2011, the BC Agriculture, Environment and Wildlife Fund (ARDCorp) approved a $40,000 grant for the development of a RCGMS. Municipalities and stakeholders provided additional in-kind, administrative and financial support. The process included hiring a professional biologist to complete a data/research component that included acquiring baseline data and defining the extent of the problem. This included:

- identifying regional participants that allowed access to private lands;
- gathering historical and anecdotal data;
- assessing agricultural impacts;
- habitat and habitat use mapping;
- goose population counts; and
- reporting the results through interim reports and a final Technical Report.

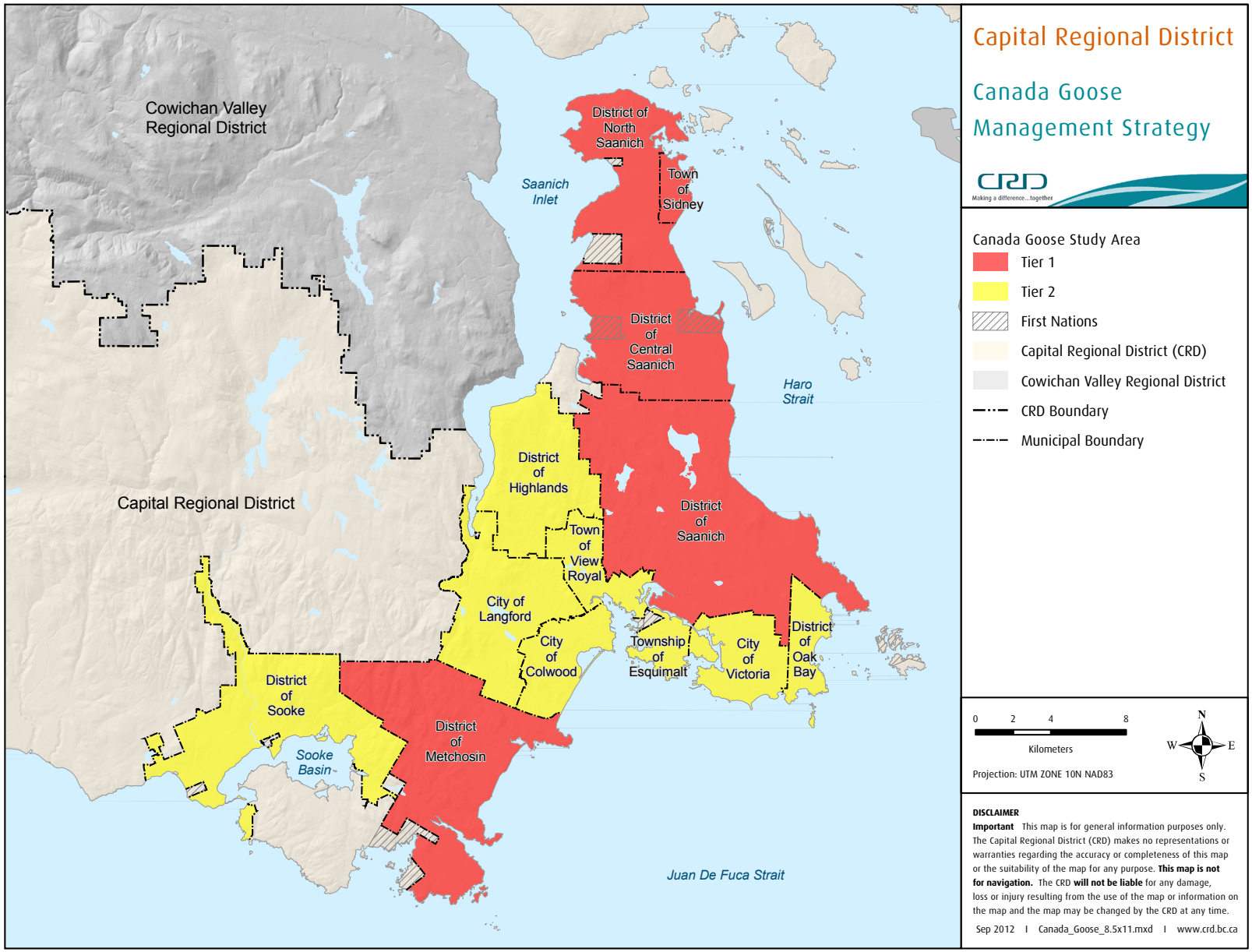
The Technical Report is included as Appendix A, although elements of the findings are included in the main document.

1.3 CANADA GOOSE MANAGEMENT AREA

The capital region consists of 13 municipalities and three electoral areas on the southern tip of Vancouver Island. The City of Victoria is the urban centre, but the region also contains Gulf Islands, rural municipalities and wilderness. The Goose Management Area (GMA) was originally defined as 12 contiguous municipalities on southern Vancouver Island (Fig. 1). The GMA was a compromise between including those municipalities that expressed concern over goose management, working at the largest landscape scale possible, and minimizing logistic challenges. Further definition of the GMA included categorizing municipalities as Tier 1 or Tier 2 (Fig. 1). This definition was determined by the interest and ability of a municipality to contribute resources towards the development of the RCGMS.

The capital region is characterized by a mosaic of urban, rural, and natural landscapes. The southern and eastern boundaries are bordered by coast line; the remaining boundaries are coastal and upland wilderness. Within the capital region are several freshwater systems that feed lakes, the largest being the Elk-Beaver Lake system situated in the District of Saanich. The Victoria International Airport and the Town of Sidney are located on the Saanich Peninsula, and are largely surrounded by farmland. Farmland is particularly prevalent in districts that make up the Saanich Peninsula (i.e., North Saanich, Central Saanich and Saanich) and Metchosin. In some districts, farmland is encapsulated by urban development creating hard edges in landscape change and land management practices.

Figure 1. Administrative boundaries of the Goose Management Area in the capital region (interim draft figure)



1.4 CANADA GEESE IN THE CAPITAL REGION

The global population of Canada geese (*Branta canadensis*) and the smaller, closely related cackling geese (*Branta hutchinsii*) together comprise 12 subspecies of geese (Banks et al. 2004) hereafter collectively referred to as Canada geese. Prior to the 1960's, Canada geese were considered migrants and summer visitants in British Columbia (Campbell et al. 1990). However, the status of Canada geese changed dramatically in British Columbia during the 1960's and 70's. In these years, a Canada goose introduction program was initiated by the Canadian Wildlife Service (CWS; Environment Canada), the provincial Fish and Wildlife Branch and conservation organizations. The goals of the well-intended program were to establish breeding populations on Vancouver Island, the Lower Mainland and other parts of BC where Canada geese were uncommon at the time, to improve wildlife viewing and sport-hunting opportunities. Goslings and breeding stock from different, large-bodied, taxonomic stocks of Canada geese that originated from elsewhere in British Columbia, Canada, and the United States were introduced to different areas of British Columbia, including the capital region (Campbell et al. 1990, Dawe and Stewart 2010, Simmons and Nightingale 2011).

Canada geese in western North America are naturally migratory. However, the transplanted young of the 1960's and 70's had little opportunity to learn natural behaviour patterns from mature geese (i.e., imprint) and did not learn to seasonally migrate. These non-migratory geese and their offspring remained in the areas to which they were relocated. Importantly, the offspring are hybrids of the different stocks of geese that were introduced to the region decades ago. As such, these birds with their admix of genetic material have created a new population of non-migratory resident geese with no single identifiable status and which are not native to the region.

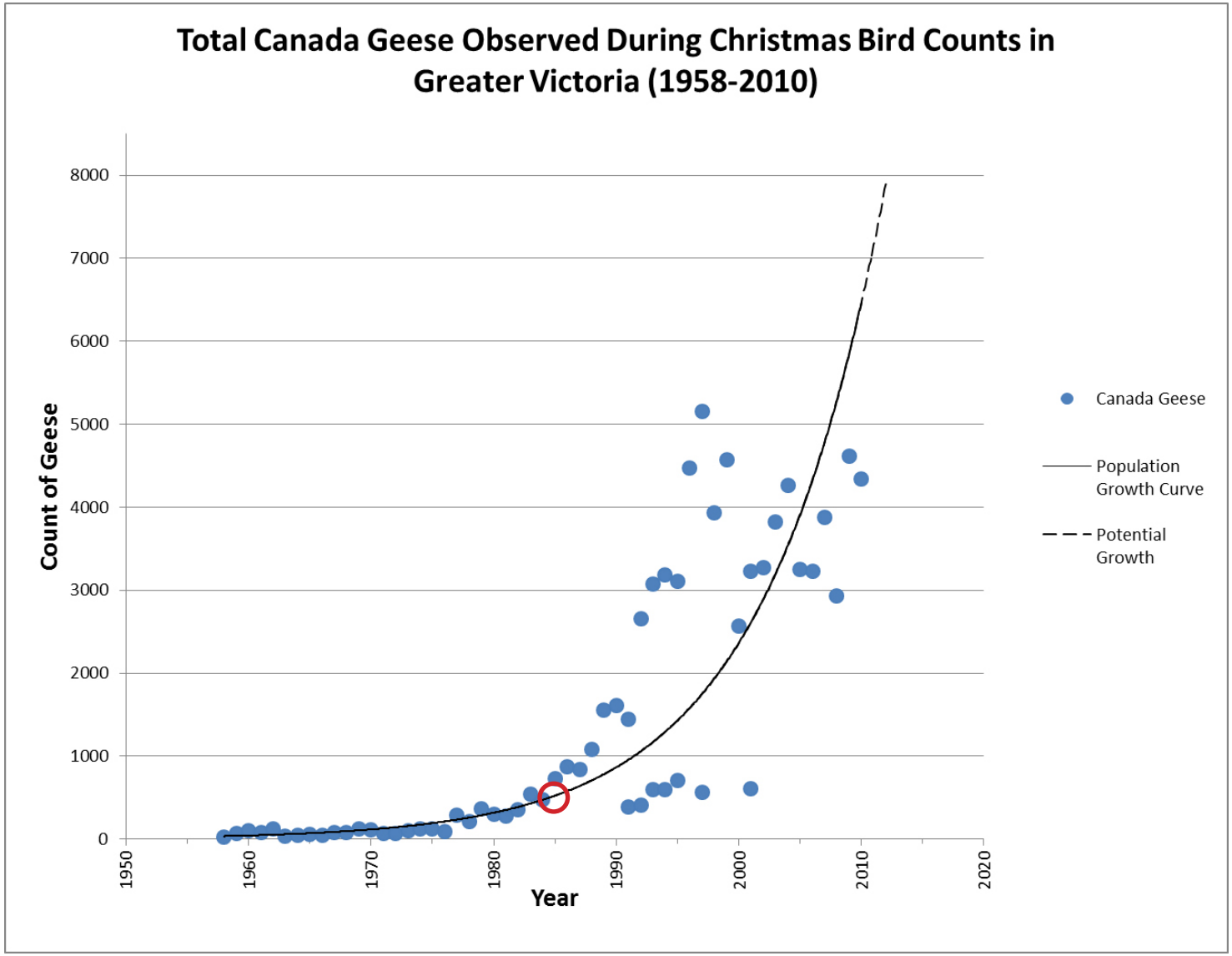
At the time of the relocations, the British Columbia landscape began a rapid transformation. Urban and rural areas increased and many areas were closed to hunting. Consequently, increased habitat with fewer population controls assisted non-migratory resident Canada geese to increase exponentially in some areas of the province. Christmas Bird Count data from the Victoria count circle between 1950-2010 show the increase in the number of geese (Victoria Natural History Society 2011). Note that prior to 1958, no geese were observed in the count (Fig 2; further detail on goose population growth in the region is provided in the Technical Report).

Today, non-migratory resident populations of Canada geese in urban and rural parts of southern BC are largely perceived as problem wildlife, due to their abundance, territorial behaviour during breeding season, crop damage, potential risks to human health, fouling of grassy areas with droppings, risk of contribution to fecal coliform levels in public swimming areas and other waters, damage to lawns and green spaces, as well as other economic losses (Alderisio and DeLuca 1999, Smith et al. 2005, Meays et al. 2006). Non-migratory resident Canada geese can be found on land governed by various jurisdictions including federal, provincial, municipal, and private properties such as golf courses, schools, and agricultural lands.

Non-migratory resident Canada goose populations have increased in the capital region to the extent that they are a general public nuisance in some areas; posing significant hazards to aviation at the Victoria International Airport; causing crop damage and economic losses to farmers; and impacting parks, natural habitats, and recreational areas.

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

Figure 2. Canada goose observations during Christmas Bird Counts (1958-2010) in Greater Victoria. The increase in the goose numbers is typical of exponential growth as depicted by the growth curve. (The red circle depicts when farmers began mitigating goose damage; more detailed analyses are contained in the Technical Report).



2 Impacts of Non-migratory Resident Canada Geese in the Capital Region

Problems from non-migratory resident Canada geese began in approximately 1985 when an increasing goose population forced farmers to employ mitigation to prevent damage to their crops. Since then, negative impacts have increased in agricultural sectors as well as elsewhere in the region. Negative impacts include:

- Damage to agricultural crops and associated costs of mitigation;
- Hazard risks at the Victoria International Airport;
- Concerns over water quality and public beach use during the summer;
- Conflict with presence of geese in parks and associated costs of mitigation; and
- Degrading of natural and environmentally sensitive habits (e.g. estuaries) including losses in ecological function and biodiversity.

The Peninsula Agricultural Commission (PAC; unpublished data) estimated that annual farming losses attributed to goose damage and mitigation costs are in excess of $300,000.00 across the GMA. This number is supported by farmer questionnaire data collected for the RCGMS in 2011-12. Costs of goose-related impacts range from no impact to tens of thousands of dollars spent or lost by individual farmers in crop damage and mitigation each year. A less measurable impact is the conflict which can arise between farmers and their urban neighbours when goose mitigation such as hazing, noise makers, or killing is used for crop protection. Much of the general public is not aware of the origins of the non-migratory resident Canada geese in the region, impacts geese have on crops, and the tools (e.g. damage permits) that farmers are allowed to mitigate goose damage.

Agricultural land is not the only land-use type in the region impacted by geese. Although no specific studies have quantified the damage potentially related to Canada geese, biologists and land managers have witnessed degradation of sensitive ecosystems. For example, the Goldstream estuary was assessed following an oil spill in early 2011. The biologist in charge stated that the area affected by resident Canada geese amounted to an area several hundred times larger than that impacted by the fuel (Ian Bruce, RPBio, Executive Director Peninsula Streams Society, pers. comm). In addition, the Warden of the Trial Islands Ecological Reserve stated that Trial Island has perhaps the highest concentration of plant species at risk compared to any similar sized location in Canada and the invasive [non-migratory resident] Canada geese pose the greatest risk to these rare plant communities (Matt Fairbarns, Warden, Trial Island Ecological Reserve, pers. comm). In most instances where biological degradation such as this has occurred, biodiversity also suffers. This has already been documented in estuaries north of the GMA in Parksville-Qualicum (Dawe et al. 2011).

The Victoria International Airport has a continuous and aggressive bird management program to reduce hazards to aviation at the airport. The most recent goose strike event occurred in 2011 when a pair of geese hit (and were killed by) an Air Canada Express CRJ on its final approach over Pat Bay. For reasons unknown, a flock of geese lifted from the water and entered the flight path of the aircraft (Captain Scott Snow, Wildlife Control Officer, Victoria International Airport, pers. comm.). An additional 369 Canada geese were encountered throughout 2011 and hazed away from the airport to prevent such accidents. Geese are the third most encountered species at the airport behind gulls and starlings (Victoria Airport Authority 2011).

Goose conflicts related to park use and management have been growing since approximately 1990 (McKelvey no date, CRD Regional Parks no date). Documented conflicts include:

- territorial geese actively protecting their nest sites and young broods,
- families of geese crossing streets within parks creating traffic hazards,
- geese aggressively begging for food,
- high density of fecal matter on beaches and grass, and
- concerns over fecal coliform originating from goose feces entering swimming water (McKelvey no date, CRD Regional Parks no date).

Geese move seasonally throughout the region and use habitats differently throughout the year (Fig. 3). Consequently, conflicts related to high goose use of specific habitats vary seasonally as well. Figure 4 shows the distribution of the number of geese/hectare on key habitats in the capital region throughout the year. These data were collected by volunteers during 2011-2012. Key elements of Figure 4 include:

- the high use of agricultural land relative to the other habitats for most of the year;
- within agricultural habitat use, seasonally flooded farmland has the highest concentration of use (Fig. 4b)
- the increase in use of non-agricultural grass fields (e.g., playing fields and schools) and freshwater (e.g., ponds and lakes) in the summer when geese are moulting;
- that nesting geese (i.e. during April-May) are less visible on the landscape as they seek protected areas to nest and hatch young.

A more detailed explanation of the goose surveys results is provided in the Technical Report along with supporting maps (Appendix A).

Figure 3. Seasonal abundance and distribution of Canada geese in the GMA

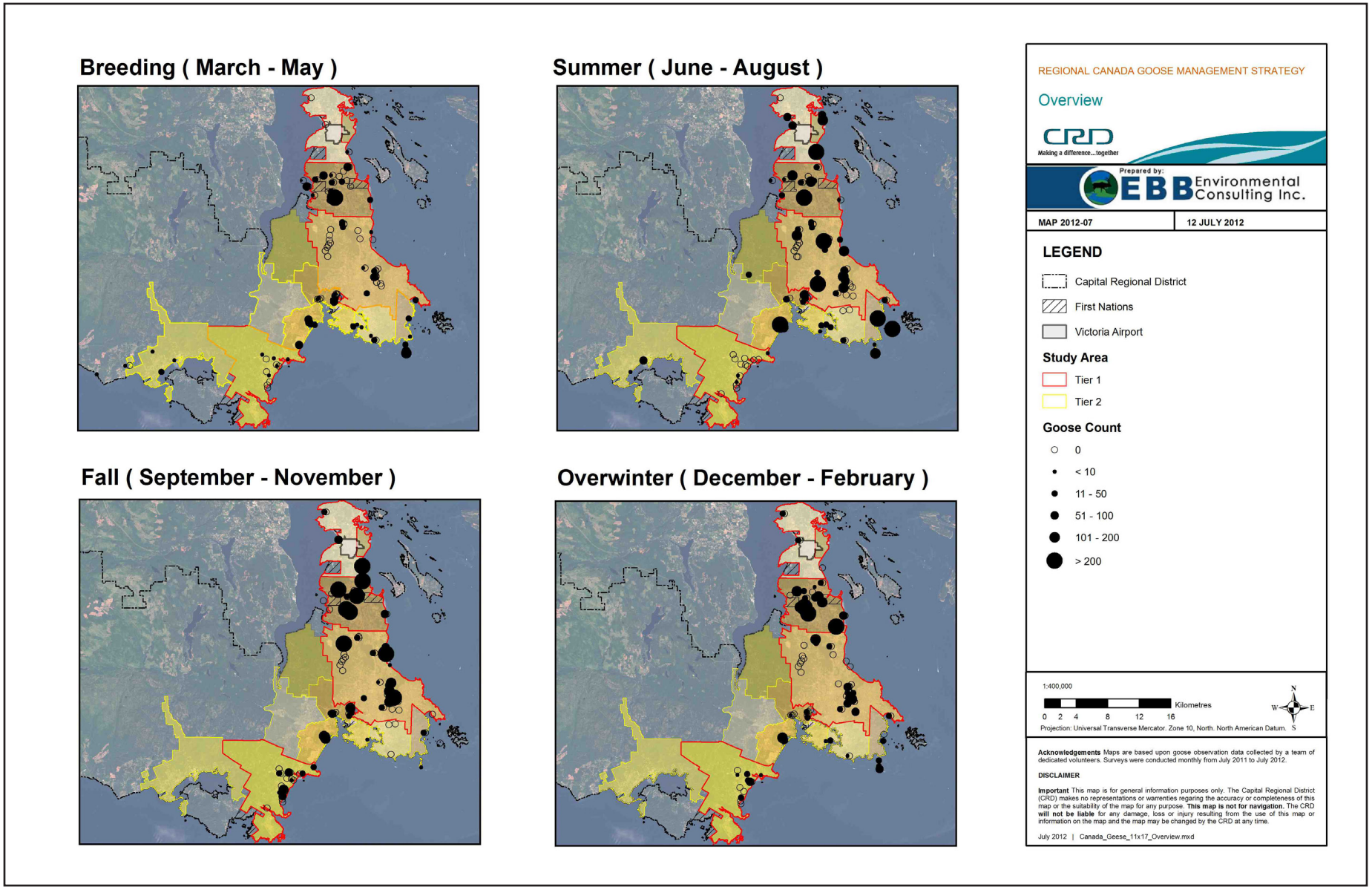


Figure 4a. Seasonal habitat use by geese expressed in number of geese/ hectare for key habitats in the capital region (July 2011-June 2012; grass fields refer to non-agricultural fields such as schools and parks).

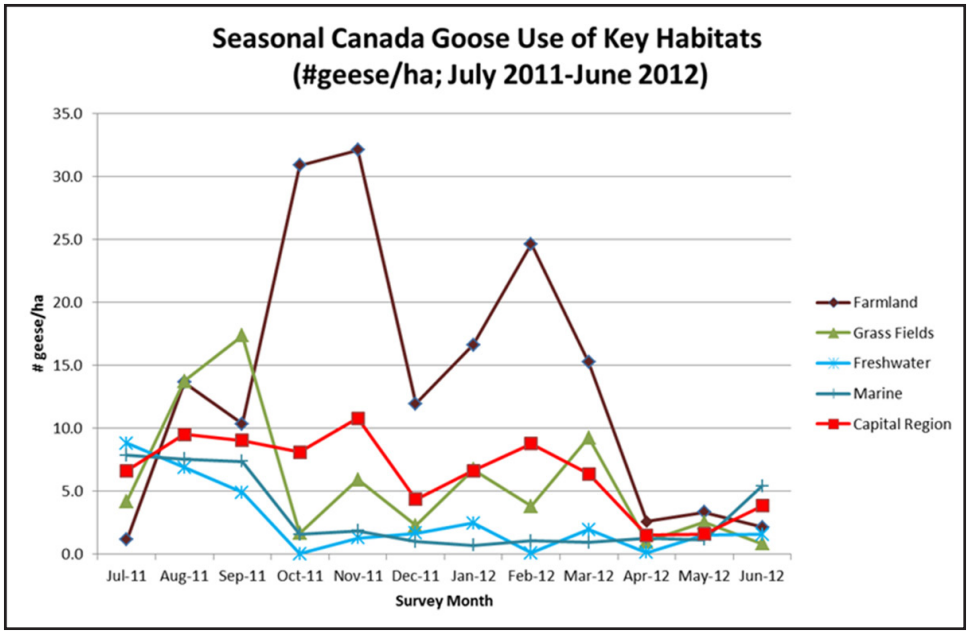
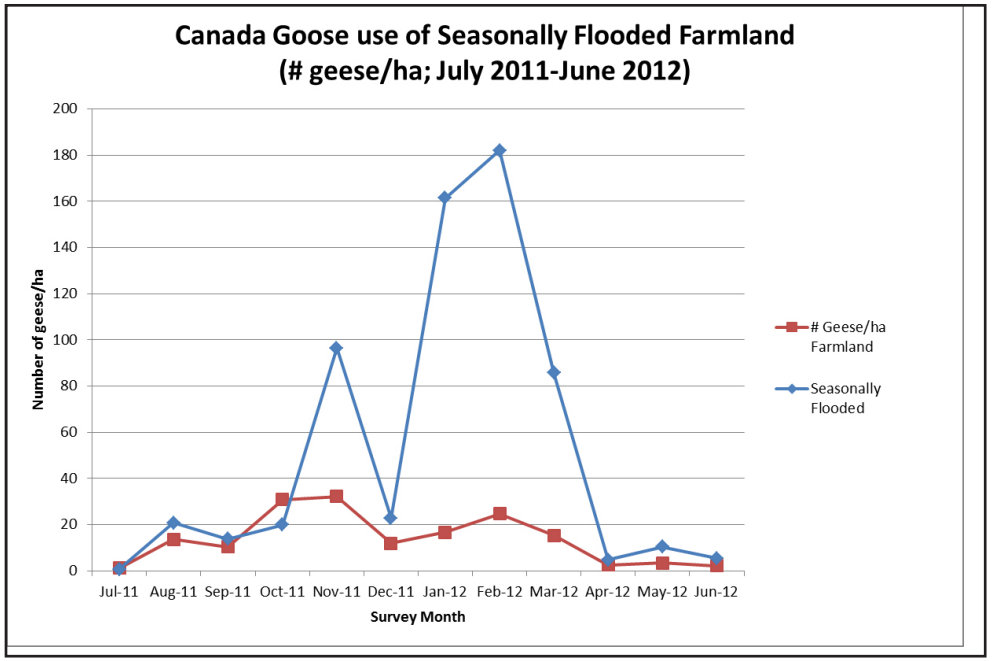


Figure 4b. Canada goose use of farmland and within farmland, the use of seasonally flooded fields (July 2011-June 2012)



3 RCGMS Targets

3.1 OVERALL GOAL

The overall long-term goal of the RCGMS is to humanely reduce impacts from the non-migratory resident Canada goose population in the capital region to a level that prevents conflict between geese and human activities. By doing so, health and safety concerns related to geese will diminish and the ability of farmers and other land managers to conduct their works will improve. Additionally, goose-related degradation of natural habitats will be alleviated.

3.2 IF GEESE ARE NOT MANAGED

3.2.1 Goose Population Growth

Non-migratory resident Canada geese in the capital region do not experience limiting factors similar to natural populations (e.g., hunting pressure, limits to food availability). Consequently, the growth rate is inflated compared to natural populations. Data on gosling recruitment (i.e., the number of geese that survive from hatching to enter into the population), mortality, and immigration are currently insufficient to estimate growth rate based on population parameters; however, some studies have estimated the growth rate based on annual counts. The rate estimates vary, but all studies indicate an increasing trend in the region. Christmas Bird Count data shown in Figure 2 indicate an annual growth rate of 10-11% (see Technical report for further detail on population growth in the GMA).

Using dynamic population modelling, Figure 5 depicts the projected responses of the regional goose population to management strategy simulations. Modeling revealed that the current population of about 5,000 non-migratory resident Canada geese will likely increase if no new action is taken. Growth is flattened at different rates when population controls such as egg addling and lethal removal are applied. The population can be stabilized with a combination of egg addling and removal of about 100 adults each year (Fig. 5b). These actions must be maintained or the population will quickly resume growth. This concept was tested in a model that assumed 200 adults were removed each year, but only for two years. The population resumed growing at approximately the same rate as if the adults had not been removed (Fig. 5b).

Figure 5 also depicts that after an estimated 15 years of egg addling and annual removal of 100 geese, the total population begins to decline. However, many other actions can be taken, that when combined, may reduce population impacts. Additional management measures such as widespread habitat modification, adjusted hunting regulations, hazing by land owners, and use of agricultural damage permits may assist with alleviating impacts. The results of these control measures are not easily modelled; however, these activities are reviewed and recommendations made in following sections of the RCGMS.

In reality, the region cannot likely host the 60,000 geese projected in the “status quo” scenario of Figure 5; however, the models demonstrate the resiliency of geese and the effectiveness strategic management can have on the population.

Figure 5a. Population modelling projecting the response of the goose population to four different management simulations 1) status quo, 2) addition of egg addling--depressing population output by 50%, 3) addling and lethal removal of 100 geese each year and 4) addling and lethal removal of 200 geese in each of the first two years of management only.

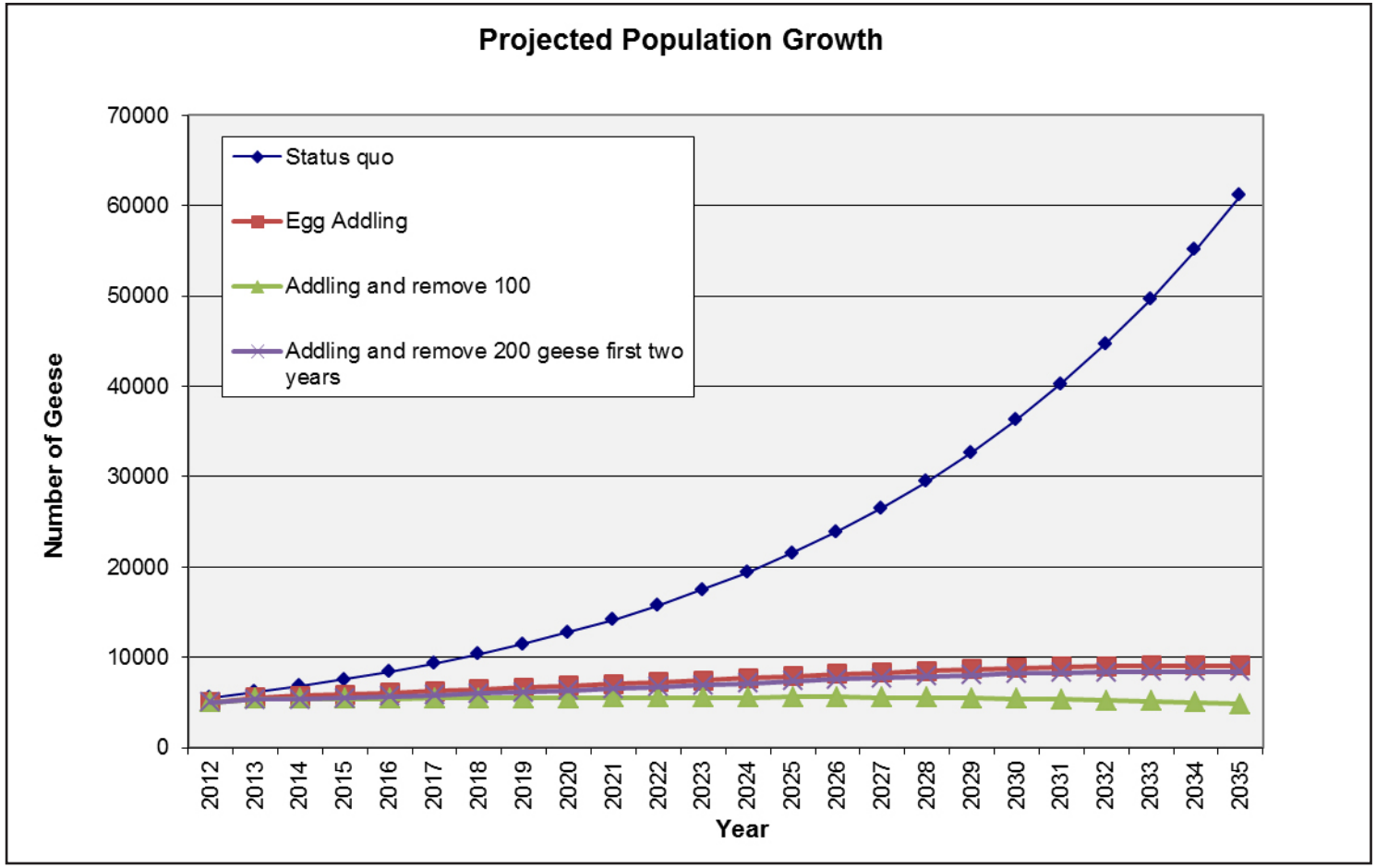
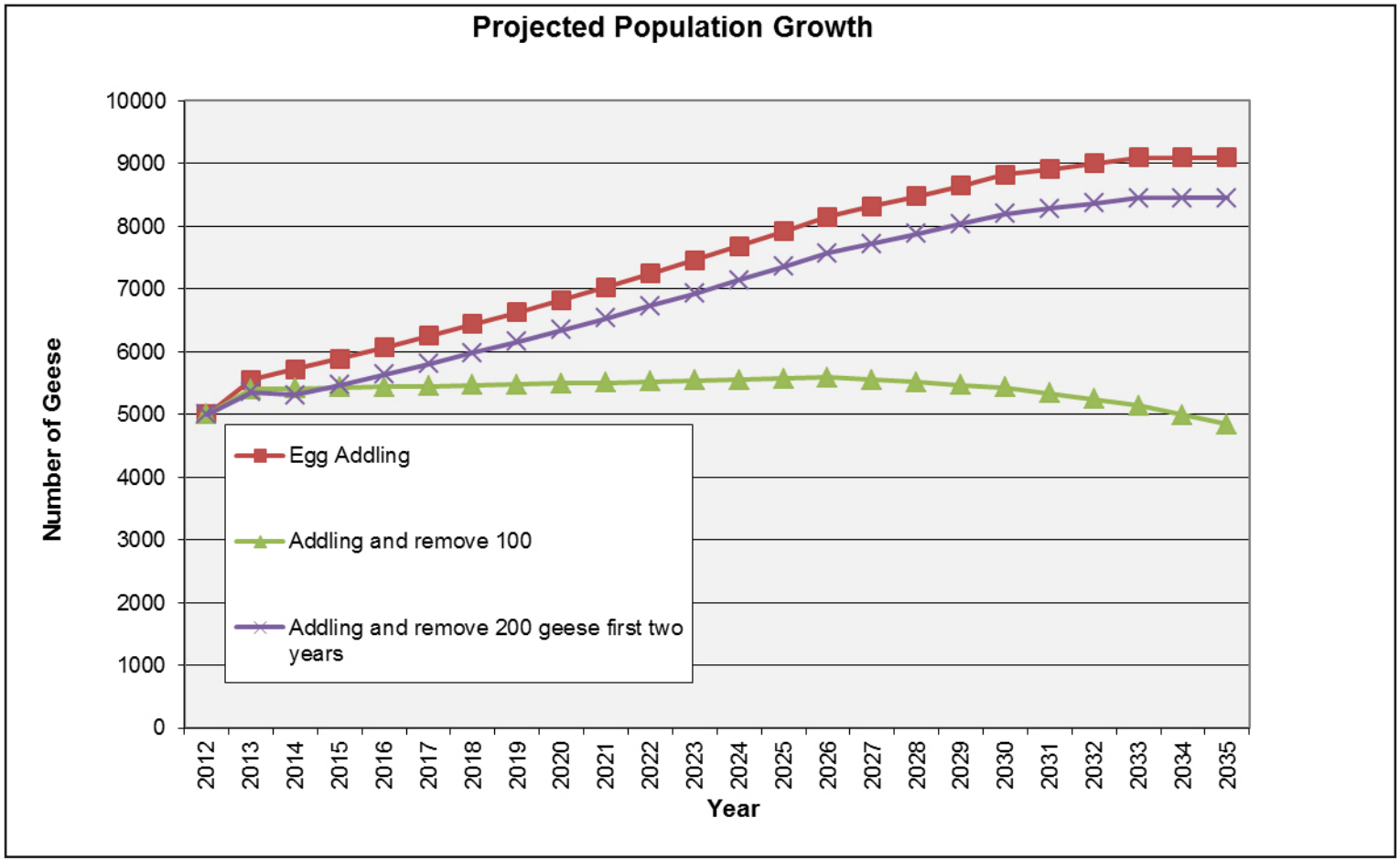


Figure 5b. Closer examination of the three management simulations



3.2.2 Humane Treatment of Geese

Humane treatment of non-migratory Canada geese is a critical consideration in goose management. As the goose population grows, more land managers will be required to mitigate goose impacts, or mitigate more intensely. Consequently, the overall conditions for geese will deteriorate. This particularly applies to hazing practices where geese are scared off properties using a variety of techniques. Hazing is a humane technique, provided geese have options to land elsewhere. However, as goose density in the capital region increases, alternative options for geese will diminish. Eventually, geese may be bounced from property to property with limited loafing and foraging sites. This becomes an inhumane approach to goose management which could result in a slow die-off of weaker segments of the population, or distribute geese more broadly on the landscape and not an approach condoned by the RCGMS. Here, the RCGMS needs to carefully consider 1) what is an acceptable non-migratory resident Canada goose population level, 2) what humane management practices are appropriate to achieve that level, and 3) how should the population be sustainably managed to alleviate conflicts between people and geese.

3.3 IDENTIFICATION OF AN ACCEPTABLE POPULATION LEVEL

A key component of developing a regional strategy is identifying the level of Canada geese that is acceptable in the region. This can be expressed as an absolute population number, and/or as a level of effort (likely expressed in dollars) that is acceptable to mitigate goose impacts. Once this line is established, the goose population should be managed to stay below this level. If left unmanaged, the population will increase until it saturates the habitat in the capital region.

Through the data collected in 2011-12 we were able to pair goose population data with mitigation activities reported by farmers and records of geese impacting CRD Regional Park operations. Referring again to Figure 2, the red circle indicates approximately when geese started impacting farming practices and park operations in the region. The population level at the red circle is between 500-1000 geese, and represents a level at which impacts from geese required minimal management. Consequently, the goal for the RCGMS is to reduce impacts from geese to a manageable level such as before the 1990's. This will be done through a combination of techniques described in the report, to be reviewed in an adaptive management framework as the effectiveness of the management strategy is evaluated.

4 Management Tools

4.1 MITIGATION TECHNIQUES

No single management tool will provide the solution for reducing Canada goose conflict. A management program must utilize a range of techniques that are seasonally timed to humanely and effectively control the goose population and its impacts. It is the responsibility of the RCGMS to recommend which mitigation techniques are appropriate for the capital region and the methods of implementation. In general, to manage the goose population and reduce conflict between people and geese the RCGMS committee members and their respective jurisdictions need to be aware of mitigation techniques allowable under the Migratory Birds Regulations. The recently published Handbook, *Canada and Cackling Geese: Management in Southern Canada* outlines all techniques allowable in Canada (Environment Canada 2010; provided as Appendix B). Techniques appropriate for the capital region are outlined in the following sections.

4.1.1 Mitigation Techniques Appropriate for the Capital Region

A. Habitat Modification

Preventing geese from using an area is the most pro-active and benign way to reduce conflict. In some circumstances this can be done by modifying habitat so it is not attractive or suitable for geese. In urban and rural environments trees, hedges, or other barriers can be installed to prevent easy access to water from land. Seed mixes of grass that are less palatable to geese should be considered when installing lawns, and mowing regimes can be changed to encourage longer, coarse grasses that are less favoured by geese. On agricultural land, farming practices such as laser levelling fields to prevent ponding, harvest rotation and leaving crop residue may lure geese away from cash crops.

Action: Suggestions for habitat enhancement for developers and commercial land owners such as golf courses and educational institutions should be prepared and included as part of the communications plan (Section 4.2).

Action: Parks within the region that are impacted by geese should look to see if there are options to create less goose-friendly landscapes. This may be a seasonal exercise that targets critical times such as when geese moult (approximately June-July) and flightless geese seek areas with safe and easy access to water and grass.

Action: Provide education to seed suppliers on less goose-friendly seed mixes and maintenance tips to make lawns less appealing to geese. Suppliers are then able to inform clients of this information.

Action: Share new and innovative farming practices that reduce goose impacts at key times.

B. Water Management

Water management is a specific and crucial element of habitat modification. Open water sources, particularly fresh water adjacent to lawns or fields are attractants to geese. Water management addresses the locations and characteristics of water features (e.g., irrigation ponds). Water features must be rimmed with appropriate vegetation preventing easy access between lawn and water, increasing predation risk, and reducing forage potential. Additional mitigation techniques include recommended design practices for water feature and retention pond construction.

Action: Work with the government and other agencies to determine feasibility of assisting farmers with ponds to reduce attractiveness to geese. In addition, work with municipalities to develop Best Management Practices (BMPs) for installing water features and water management guidelines. BMPs would be relevant to any water feature (e.g., irrigation ponds, storm drain overflow, parks pond).

C. Hazing/Scaring

Hazing is an effective means of temporarily scaring geese away from a conflict area and can be useful in parks during peak summer public use, golf courses, and agricultural fields. The key to hazing is to prevent a routine to which geese become habituated and hazing no longer works. An unintended consequence of hazing geese can be the shift of geese from one location to another, thus diffusing and spreading the problem, instead of alleviating the problem.

Action: In the first year of the program, a pilot coordinated hazing program should be conducted within a defined area to determine what are the levels of effort, best combination of techniques, the potential for taking advantage of economies of scale, and the ability to prevent "ping-ponging" of geese back and forth between habitats and still achieve results desired by the management committee. This will provide a real estimate of effort and cost for an on-going effective hazing program. Training should be provided to farmers and land managers to help develop the most effective hazing protocols specific to their lands.

D. Temporary Relocation

Currently, with the large and widely distributed non-migratory resident Canada goose population, relocation is not feasible. However, as the goose population declines, relocation may be a reasonable future option to manage small conflict pockets of geese. Relocation guidelines are provided in *Best Practices for Capturing, Transporting, and Caring for Relocated Canada Geese* (Environment Canada 2011).

Action: Relocation is not recommended, but is a management tool that the RCGMS remains aware of.

E. Population Control

Reduction of Canada goose numbers must occur in the capital region to achieve a balance between geese and people. Increasing egg addling, hunting within regulated seasons, and farmers taking advantage of damage permits for crop protection will slow goose population growth. However, a significant portion of all land in the GMA is closed to hunting. As such, the burden of population control occurs on a relatively small land base and is conducted by a relatively small number of people (i.e. hunters and farmers). This inherently limits the potential impacts of some Actions.

Action: Egg addling The most likely route towards reducing the population will be addling. Addling is a technique that renders the embryo in an egg non-viable (e.g., through coating the egg with corn oil to prevent gas exchange across the shell membrane). Egg addling is a relatively simple and humane tool for controlling the reproductive output of Canada geese. To be effective, crews must be trained to systematically access nesting areas and addle eggs in such a way that geese will not attempt to immediately re-nest. In addition, crews must be thorough, ensuring all nests in a targeted area are included. Egg addling should occur in April and must be done under federal permit. The RCGMS proposes to target a key area and conduct a pilot egg addling project to determine the level of effort and success. In doing so, the goose management committee will receive a real idea of effort and costs to run a program at a regional scale.

Egg addling is often within public viewing and crew members must be able to sensitively address questions and refer the public to the project manager and other educational resources for additional information.

In addition to the actual addling, the pilot addling program should include provision of an egg addling protocol manual, mapped nest locations using GPS technology and maintaining records of nest sites and addling activities. The addling protocol should be available at the onset of the program to be used as a resource to answer public inquiries specific to the capital region egg addling process.

Field methodology should be consistent with the *Handbook, Canada and Cackling Geese: Management in Southern Canada* (Environment Canada 2010) and the recently revised *Humane Society of the United States Canada Goose Egg Addling Protocol* (2009). The incorporation of Humane Society methods ensures that the addling program is sensitive to public concerns while still remaining thorough. This is an important tie to the public information program.

Action: Hunting utilizing the existing hunting framework to help control population growth is administratively efficient and can be implemented almost immediately. Bag and possession limits have been increased for the 2012-2014 seasons, in addition to implementing four staggered Canada goose seasons (see http://www.env.gov.bc.ca/fw/wildlife/hunting/regulations/). As part of the communications program and permitting information package, landowners should be made aware of the BC Wildlife Federation Outdoor Passport Program, which assists hunters and landowners with access and control issues related to hunting on private land (see www.bcwf.bc.ca and click on programs). The RCGMS should also assist hunters and farmers with coordinating hunting efforts for the purpose of goose control. Accordingly, Aboriginal members should be encouraged to participate in Canada goose hunting on lands impacted by geese. As part of the coordinated effort, the RCGMS should assist farmers and hunters to identify problem pockets of non-migratory resident Canada geese. This will achieve two purposes 1) hunters will assist farmers with maximum removal of problem birds and 2) migratory sub-species of Canada geese that are not typically problematic will not be targeted in the hunts.

Action: Evaluate firearms discharge bylaws within the GMA boundaries to ensure the practicality of hunting as a management tool.
The RCGMS should work with municipalities within the GMA and management agencies to develop a system where firearms discharge bylaws and associated permits are streamlined across the GMA. This could be part of a program similar to the Fraser Valley Special Area Hunting License system used for waterfowl hunting on the Lower Mainland (see http://www.env.gov.bc.ca/fw/wildlife/hunting/regulations/fvsah.html).

Action: Request municipalities define areas where hunting is allowed.
In conjunction with the review of firearm discharge bylaws, the RCGMS should work with municipalities within the GMA and management agencies to maximize areas open to hunting, and to clearly identify areas that could support at least limited openings for goose hunting during regular goose seasons.

Action: Facilitate damage permits for agricultural damage
The CWS may issue damage permits to farmers/farm managers to protect crops from damage caused by Canada geese. The two types of damage permits are:

1) Kill-to-support-scaring: issued to farmers when the intent of the mitigation technique is not to reduce the goose population, but to protect crops through changing goose behaviour. Generally, the conditions of these permits allow two geese per day (maximum) to be killed. The carcasses are left in the field to act as deterrents for other geese. In doing so, geese learn the consequences of grazing in fields where scaring techniques are used.

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

The use of blinds, decoys, baiting or calls is not permitted with any damage permit as per Section 27 (2) of the Migratory Birds Regulations that states “No person while acting under the authority of a permit issued under section 25 or 26 shall use decoys, duck or goose calls or blinds or other concealment”. The intent of this regulation is to avoid conflicts of interest by land owners claiming damage in order to extend hunting seasons.
The RCGMS should be available to assist with the documents required for the permit (e.g. a management plan). In addition, a RCGMS member should be available to answer questions, assist with the application, or at minimum, provide direction to the communications package that addresses permitting requirements (see Policy Review and Streamlining).

Action: Review federal damage permit conditions
For farmers in the GMA, the permit conditions lead to frustration from the inability to maximize the number of geese killed under permit (e.g., restrictions on the most efficient methods to kill geese outside of regular hunting season). In other circumstances, when the maximum number of geese killed under permit

has been achieved, farmers are frustrated by the length of time it takes to renew permits. A final frustration for farmers is the condition that they must provide proof that all other management practices have been attempted with no success. Communications with CWS regarding permit conditions should be initiated. In addition, coordination of effort between farmers should be facilitated by the RCGMS to improve the potential to maximize goose kill success with damage permits.

Action: Examine the need and feasibility of a regionally implemented, managed goose kill
Several management tools are identified in this strategy to reduce impacts and control the population of non-migratory resident Canada geese. If these tools are used to their maximum ability, optimal results (e.g. reduction/prevention of goose impacts) may be achieved without having to engage in goose population reduction through a managed kill.

Under the current framework, federal kill-to-remove permits can only be considered if the land manager is able to demonstrate all other management practices have not been successful. In addition, the permits only apply to agricultural lands. As such, the burden of reducing impacts of geese throughout the GMA through population reduction lies with farmers and hunters (accessing farmland). Several areas in the GMA which produce geese (i.e. nesting sites) and provide forage for geese are outside of agricultural lands and are permanently excluded from hunting (e.g. public parks and golf courses). The RCGMS must address the potential imbalance of management activities so that no one sector or jurisdiction shoulders management in terms of supplying resources and monitoring results.

A managed kill would reduce the non-migratory resident Canada goose population, decreasing its size and breeding potential across the GMA. The non-migratory resident goose population should be monitored (see Section 6.2.2) to determine how the population responds to management tools and if the feasibility of a managed kill should be discussed with CWS.

F. Policy Review and Streamlining

A barrier to Canada goose management in the capital region, particularly to individual land managers and farmers, is the inconsistency in by-laws and policies across the region. This is further complicated by the several permits that are often required from different regulatory agencies for different management techniques.

Action: Review of relevant municipal policies, best practices guidelines and by-laws across the region. These may pertain to feeding wildlife, discharge of fire-arms, noise, water management, vegetation management and development guidelines. Municipalities would need to be responsible for ensuring streamlining occurred across the region.

Action: Develop a regional communication piece or package that outlines the permits, authorizing agency, application process, timelines, costs, and provides a single point of contact so a landowner/manager can easily conduct appropriate goose management on his/her property. As part of, or in addition to this package, a fact sheet should be designed for farmers to provide to citizens. The fact sheet would explain the rationale for goose mitigation and the tools that are available. In addition it could provide citizens with a point of contact, other than the farmer, to further discuss the issue. This should be developed as part of the larger communications program (Section 4.2).

4.2 MANAGEMENT SCENARIOS

The population modelling provided in Section 3.3 indicates long-term implementation will be required to achieve management goals. Examples of management timelines are provided below:

Management Scenario 1:

Timeline: 15-25 years
Goal: Stabilizing the population with eventual plateau (approximately 9,000-10,000 geese) and then a decline if management activities are maintained
Key Management Actions: Slowing population growth through annual coordinated regional egg addling; mitigation such as coordinated hazing and habitat modification to reduce impacts of geese in the GMA.

Management Scenario 2:

Timeline: 5-15 years
Goal: Flattening population growth, and a gradual population reduction (3000-4000 geese) with continued decline if activities are maintained
Key Management Actions: Assisting farmers with maximizing population control through damage permits; maximizing areas open to hunting; streamlining by-laws and permits across municipalities (e.g. firearm by-laws); annual regional egg addling; coordinated hazing; habitat modification.

Management Scenario 3:

Timeline: 3-5 years
Goal: Significant population reduction; remaining population growth rate controlled
Key Management Activities: Assisting farmers with maximizing population control through damage permits; maximizing areas open to hunting; streamlining by-laws and permits across municipalities (e.g. firearm by-laws); implementing a managed kill program; annual regional egg addling; coordinated hazing; habitat modification.

The goose population of 1985 (ca. 1000 geese) was the threshold above which serious impacts from geese occurred. This may be the population level that can be managed in the region and as such, should be the population target. Under the current federal regulatory framework, population reduction through a managed kill (Management Scenario 3) is not permitted and would be illegal. However, upon reviewing the effectiveness of all other management techniques used in the GMA, the RCGMS should engage CWS in discussions regarding the feasibility of a managed kill (if considered necessary). These discussions would initially focus on lethal removal to mitigate agricultural impacts, and eventually include mitigation of all adverse impacts in the GMA. Only if a managed kill is approved would Scenario 3 become a viable option.

4.3 COMMUNICATION PROGRAM

4.3.1 Objectives

A critical part of urban wildlife management is an effective communications plan. It is the responsibility of the RCGMS to educate the public on the origins of non-migratory resident Canada geese in the region and the associated impacts.

Management of any species, particularly one that is visible, beautiful and named for the country, may be received by the public at an emotional level rather than one that regards concerns for health and safety or economic losses. The RCGMS must develop a communications plan that delivers consistent messages regarding goose management and fosters a culture that supports a well-planned strategy. Messages provided to the public must address the misconceptions associated with the capital region goose population, identify the problems associated with non-migratory resident geese and outline the goals of the management strategy.

4.3.2 Communication Plan Characteristics

The communications plan should be

1) transparent, and clearly define the program's aim,
2) informative without being patronizing;
3) consistent across jurisdictions;
4) a point of contact for further information and resources; and
5) scientifically defensible--every message must have a supporting argument.

4.3.3 Target Audience

The subject of Canada goose management will likely attract interest from a diverse audience. At one end of the spectrum, citizens will ardently and vocally express opposition to any form of management. At the opposite end of the spectrum, citizens may be supportive of immediately removing/reducing the non-migratory resident Canada goose population, but not necessarily supportive of expending resources and time to research the goose population and associated impacts. Within the middle ground people likely to be interested in learning about the RCGMS will include:

- Park users;
- Naturalists;
- Golf course superintendents;
- Park managers;
- Land managers of institutions/grounds (e.g., CFB Esquimalt, Royal Roads);
- Airport Management Team;
- School districts (e.g., if geese are damaging and fouling school grounds);
- Agricultural producers;
- Wildlife rescue/support groups;
- Homeowners (particularly with large tracts of land, ponds, or waterfront);
- Marina managers;
- Any citizens who have aggressive or high numbers of geese on their property; and

- Wildlife and wildlife habitat biologists/managers.

Therefore, information should be directed at this audience, and be comprehensive enough that individuals can make informed opinions on goose management, and access further resources should they want to learn more or participate in goose management activities. The RCGMS will benefit from a transparent process with a well-developed communications plan that will more likely result in community support.

5 Moving Forward

5.1 STAKEHOLDERS

Stakeholder responsibilities will vary depending on the jurisdiction each stakeholder represents. Example stakeholders may expand to include:

- Associations (e.g., farming, marina, golf course, tourism, flying clubs),
- School Districts/Educational Institutions,
- Municipalities,
- CRD,
- First Nations,
- Victoria International Airport,
- Vancouver Island Health Authority, and
- Federal and provincial government agencies.
- Wildlife and Wildlife Habitat biologists/managers

Responsibilities will vary, but may include funding, administration, communications, by-law development, enforcement, relevant authorizations, and advisory roles.

Additional groups (e.g., Vancouver Island Health Authority, animal welfare, government agency veterinarians, and conservation groups) may be approached for discussion. The continuation of a RCGMS will ensure that management occurs across the capital region and geese are less likely to be bumped back and forth between jurisdictions. In practical terms this may mean some changes to municipal operations. Municipalities should be prepared to:

- write and enforce by-laws that prohibit the feeding of geese on municipal lands and allow hunting where possible;
- ease or streamline permitting restrictions to encourage landowners to take responsibility for managing geese on their own lands;
- reduce the attractiveness of public lands to geese by modifying habitats or employing deterrents;
- examine water management so that irrigation ponds or other open-water features are not goose attractants or provide refugia for geese; conversely identify areas where geese can seek refuge and not be harassed;
- consider geese when determining landscape decisions and development applications;
- support growers with mitigation policies so that the stigma associated with mitigation is removed from individual farmers and lies with the municipalities (i.e., farmers do not suffer a public backlash);
- provide a sophisticated public information program that may be delivered in parks, on signage, a website etc.

5.2 FUNDING

A funding structure should be developed (e.g., per capita representation from each of the stakeholder municipalities and a flat-fee for non-municipal stakeholders). Stakeholders should make goose management a regular line item in their respective budgets to ensure management is long-term and well planned.

6 RCGMS Implementation

6.1 ESTABLISH A MANAGEMENT COMMITTEE

Consistent with the fact that Canada goose management must be long term, a committee or working group (e.g., 5-6 members) must be established to guide the management strategy over the long term as well. This committee would ensure community needs are being met, the goals of the strategy are maintained (e.g., management through humane and scientifically founded measures) qualified staff or contractors implement technical facets of the program as required, budgets are developed and adhered to, and the program is reviewed. The committee will need to establish governance to ensure objectives are met and administrative functions are completed. Similar models for management committees have included representatives from each of the participating stakeholders and sharing the leadership responsibilities through an annually rotating chair that acts as a point of contact for media, consultants, and administrative duties.

6.2 SHAPE OF AN ANNUAL PROGRAM

6.2.1 Mitigation Techniques

The implementation of techniques recommended in this document should be coordinated and a record of each technique should be maintained. Tracking the data will determine the effectiveness of individual mitigation techniques as well as contribute to evaluating the overall success of the regional program.

6.2.2 Canada Goose Population Monitoring

On-going monitoring will allow assessment of the population response in terms of growth, abundance and distribution on the landscape. Population monitoring should occur at key times: 1) spring pairs/nest surveys, 2) post-nesting gosling surveys, and 3) utilize Christmas Bird Count data for mid-winter census.

The summer moulting season is an optimal time to mark geese with leg bands. Leg bands allow individuals or cohorts of geese to be identified at remote distances (~300 m) and are a strong tool for population monitoring. Banding data would provide more scientifically founded answers to specific population demographic questions.

6.2.3 Evaluation

Evaluation must consider implementation costs and effectiveness of the program. Evaluation should weigh feedback from stakeholders, general public, ease of logistics/implementation, costs, levels of goose damage and impacts to the goose population.

6.2.4 Administration and Reporting

Each year, permits will be required for regional goose management activities. Regulatory agencies that grant authorizations for goose management activities will require documentation on the results of activities. In addition, data collected during management activities must be compiled prior to evaluation. Reporting should be provided to stakeholders so they are clearly aware of the process and results that each year of management has accomplished. These results are essential to prove success of the strategies.

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APPENDICES

APPENDIX A: Regional Canada Goose Management Strategy - TECHNICAL REPORT

APPENDIX B: HANDBOOK - Canada and Cackling Geese: Management and Population Control in Southern Canada